THE MANAGEMENT OF CHILDHOOD ASTHMA

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by

FREDERIC SPEER M D

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PREFACE

What is childhood asthma? Is it a mysterious syn drome for which there is little hope and no specific treat ment? Is it a more or less harmless childhood problem which will eventually be outgrown? Is it some sort of neurosis with roots in the mother s emotional life? In spite of the fact that allergic management of asthma has proved uniformly effective questions like these continue to be asked or implied

In Burton s *The Anatomy of Melancholy* is found this abbreviated account of a Sixteenth Century consulta tion In Reinerus Solenander s counsels he and Dr Brance both agreed that the patient s disease was hypo chondriacal melancholy Dr Matholdus said it was *asthma* and nothing else Taking his cue from the forthright dissenting consultant the allergist of today might add And it is an allergic disease and nothing else!

With an increasing number of physicians becoming interested in the allergic approach to childhood asthma a need has arisen for a text which would include the methods essential to the proper establishment of allergic control *It is to meet this need that this manual has been* prepared Neither this book nor any other can hope to give all the information that every physician will require in every case but if with its use the reader can develop a sound basis for an attack against the disease it will have fulfilled the purpose for which it was written

FREDERIC SPEER M D

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THE MANAGEMENT OF CHILDHOOD ASTHMA

It is one of the wonders of pediatric allergy practice that the mother of the asthmatic child is typically patient, devoted, observant, and wise. To this typical mother this book is dedicated.

She openeth her mouth with wisdom, and in her tongue is the law of kindness.
—*Proverbs XXXI 26*

The asthma doctor must and dare not forget that his own quiet, deliberate and reassuring manner and his absolute conviction that almost all cases of asthma can be cured, constitute *one of the most important prerequisites for success.*

—URBACH

Chapter 1

THE ASTHMATIC CHILD AND HIS FAMILY

ASTHMA AND THE CHILD

No matter how poor a medical term may be, once it becomes attached to a disease entity it is not likely to be replaced This is true of malaria and angina pectoris, and it is true of asthma An attempt to improve the term and differentiate it from cardiac dyspnea has been made by speaking of bronchial asthma but this is of little help as all asthma is bronchial It might better be called *bronchial allergy* or allergic bronchitis but these terms have little backing and no official sanction

Asthma may be defined as an allergic disease of the bronchioles and small bronchi characterized by edema of the mucosa muscle spasm, and hypersecretion of mucus The outstanding clinical manifestations are dyspnea wheezing and cough These phenomena occur in attacks, separated by intervals of more or less relief Although spontaneous remission is not unknown in asthma it is essentially a chronic disease which if untreated usually leads to progressive loss of vital capacity and emphysema It is a common disease of childhood and is found at all ages

Asthma seldom if ever occurs as an isolated allergic manifestation The patient is allergically speaking 'sick all over asthma representing only one of many allergic manifestations For uniformly successful results in this

disease the physician must identify *all* allergic manifestations and *all* responsible allergens

The young child does not seem unduly disturbed by his asthma He is aware of his heaving chest and can hear his wheezing, but it does not seem to occur to him that everyone is not affected in the same way As he grows older he begins to see that he is different, that he is under certain restrictions, and receives special consideration from others With this new awareness comes the urge to get well It is a source of continual surprise to allergists to note how early in life their little patients accept the restrictions and discomfort of allergic management In watching their diets they are often more alert than their mothers, and where hyposensitization is given, they accept their "shots" with remarkable cheerfulness and fortitude

THE FAMILY

A surgeon repairing a hernia does not invite the family in to assist him A physician dealing with an asthmatic child, however, must do just that, and his success depends very much on his ability to gain the confidence of the parents and enlist their cooperation To gain their confidence he must understand how they feel about their child, and to enlist their cooperation he must educate them in the fundamentals of allergy and asthma

The Parents' Feelings

The most significant reaction of parents on becoming aware that their child has asthma is fear They have probably known of asthma among their acquaintances and they think at once of the most serious case in their experience The "asthma" they have known may well have been any one of a number of other chest diseases, but the word still strikes fear to the heart and often leads

to dismay and panic With the passage of time the attacks are inclined to become increasingly severe and the desire to escape from so frightening a situation is often overpowering leading to the urge to flee to some supposedly ideal climate Such flight not infrequently takes place often at the price of family disruption and financial ruin

The child then is often the center of a taut emotional situation and no matter how calm the surface it is well to proceed on the assumption that all is not well within The mother is certain to have had extensive and gratuitous advice from all sorts and conditions of people and has almost certainly been assured by someone that the whole problem stems from the fact that her child is unwanted and rejected In her unhappy and bewildered condition she may half way accept this cruel judgment and with her original problem complicated by guilt and frustration her misery may have been heightened to an almost unbearable extent

If the physician sees that he is dealing with a family whose integrity is threatened by the emotional by-products of asthma he has an opportunity to do much to restore it When the parents learn that he is fully aware of their feelings and looks upon them with sympathy and understanding the way is clear for their self confidence and poise to return If he then proceeds to embark on a tireless campaign against the child's disease even though progress be slow and uneven he can look for patience and trust in his relations with the family

Parent Education

The allergist works mainly with the mother of the asthmatic child and he should teach her all she is capable of learning about allergy and asthma withholding nothing that will make for better management of the disease

She should know something of

(1) The theory of allergy
(2) The nature of asthma
(3) The common causes of asthma
(4) How the causes are detected
(5) The limitations of skin testing
(6) What to do in case of an attack
(7) How long it will probably take to achieve control
(8) Special factors applicable to her child

Much of this information she can pass on to her husband and all of it to her growing child No fear need be felt that the mother will go off on her own in treatment Some women do this anyway and the better she understands allergy and asthma the less tempted she will be to experiment with irrational methods

An excellent booklet for family education *Allergy in Children* is now available through the American Foundation for Allergic Diseases Inc 271 Madison Avenue New York 16 New York

Chapter 2

THE DIAGNOSIS OF ASTHMA

It is impossible to exaggerate the importance of careful diagnosis in the child with dyspnea, wheezing, or cough It is the responsibility of the allergist to determine if each case is *really* asthma and *only* asthma The three essentials in diagnosis are

(1) The presence of the typical clinical picture
(2) The presence of associated allergic traits
(3) Differential diagnosis

THE CLINICAL PICTURE

An attack of asthma characteristically begins with sneezing, nasal discharge and a dry cough As the attack develops the cough becomes steadily more severe and fre quent, and wheezing and dyspnea rapidly set in It is soon apparent that the distress of the child is great This is re flected in his anxious expression, labored breathing and pale clammy skin In severe attacks the lips may be cyano tic, especially in young children, and further evidence of oxygen want may include restlessness irritability and even delirium The patient's efforts are soon concen trated on breathing, and this, with his frequent inability to take fluids, leads to progressive weakness and dehydra tion Vomiting is common and may, as Ratner[*] has point ed out, bring a measure of relief If it is prolonged how ever, it further interferes with respiration and greatly aggravates dehydration and fatigue

Examination of the chest at the height of the attack reveals evidence of more or less emphysema, with the chest distended and the amplitude of respiratory movements lessened The percussion note is tympanitic, and cardiac dulness is obscured Most obvious of all are the classic asthmatic rales These are best described as squeaks, and occurring as they do over wide areas of the chest and with variations in pitch might be compared to the squeaking of a chorus of mice

In prolonged attacks these rales may become coarse, *but it should be emphasized that the true asthmatic rale* is always expiratory It is true that moist inspiratory rales may occur in asthma, but their presence usually indicates infection atalectasis, or bronchiectasis

Between attacks the child may present no chest findings but in severe cases, more or less wheezing may usually be found at almost any time If it is not heard during ordinary breathing it may be brought out by the method of Lineman" The examiner holds one hand on the front of the chest, the other on the back The stethoscope is held between the thumb and palm of one hand and during expiration the examiner s hands are pressed firmly together so as to empty the chest of air In this way, wheezing can *often be produced when it is otherwise absent*

In an occasional case there will be evidence of deformity of the chest In children around the age of 2 years, the sternum is often depressed, while in older children, changes resembling the pigeon breast of rickets are seen (Fig 1) Although less common, the typical barrel chest of chronic emphysema may be found

Modes of Onset

Of fundamental importance in the management of asthma is an understanding of the various ways an attack



Figure 1 Changes in Rib Cage in Childhood Asthma (a) Early changes in six year old boy Note slight prominence of sternum and upper costal cartilages (b) Advanced changes in nine year old boy Note marked forward thrust of sternum flaring of ribs and Harrison s groove Picture taken during inspiration so as to accentuate these findings

may be initiated Below are listed five distinct mechanisms More than one may be operative in any case and there may be mixing of types but if the patient is carefully followed his particular way of reacting will eventually become apparent

(1) *Simple Exposure* In cases of marked sensitivity exposure to the allergen is sufficient to bring on an attack Familiar examples are patients sensitive to animal

epithelials or to such ingestants as aspirin or shrimp If there is no other sensitivity the patient is entirely symptom free between attacks If simple exposure were the only mechanism or even the usual mechanism in allergy the management of asthma would be far simpler than it is

(2) *Exceeded Tolerance* Many if not most asthmatic children have some degree of tolerance to allergens to which they are sensitive and develop a frank attack only when this tolerance is exceeded A child sensitive to house dust for example may have an attack only when helping with house cleaning and another sensitive to chocolate may flare up only when as his mother says He makes a pig of himself Many of these patients have some evidence of asthma between attacks

(3) *Triggered Attacks* Allergic children especially young children often show little if any evidence of asthma until their allergic balance is upset by a trigger mechanism The most important of these is respiratory infection [8] and mothers commonly feel that their children are allergic to colds Asthma attacks are especially likely to appear during the incubation period of measles and certain other infectious diseases [9]

Also of importance as a trigger mechanism is thermal change especially chilling and this at least partially accounts for the fact that some children are upset by sudden weather changes It should be remembered however that the chief cause of weather change is wind and wind often brings high mold and pollen counts

(4) *Allergens Acting Together* Certain allergens are relatively or entirely harmless when acting alone but may initiate attacks when acting synergistically with another such allergen This phenomenon is found commonly in asthma of combined food and inhalant origin An example is the patient who tolerates oranges at any time

except the ragweed season or to put it another way tolerates ragweed quite well except when he eats oranges

It is important that allergens of this type be identified as failure to do so is an important source of failure in the treatment of inhalant allergy Parents of children being given pollen or mold hyposensitization should be advised that failure in such treatment may call for investigation of foods as synergistic allergens

(5) *Cyclic Asthma* Asthma at times shows a tendency to occur in cycles with no apparent initiating factor In some cases the periodicity of attacks is remarkably constant and mothers can predict almost to the day when an attack will occur This type is most commonly found in young children with food allergy There is a seasonal factor in many cases as attacks often do not occur in hot weather It is interesting to note that this tendency for the manifestations of food allergy to appear in cycles and be worse in winter has been reported in the Northern Hemisphere by Rowe and in the Southern Hemisphere by Briedahl [°]

SYSTEMIC ALLERGY

Essential to a proper understanding of childhood asthma is an awareness that these children are highly allergic individuals who commonly present widespread evidence of systemic allergy When confronted with a multitude of these complaints related by an anxious mother the physician may be tempted into the old concept of the neurotic origin of asthma but if he proceeds to deal with them as bona fide somatic disorders he will find that they will help him establish the allergic nature of suspected asthma and help him find the cause If he then proceeds to relieve them he will find that he has relieved a constitutional allergic problem which represents far more

than a simple bronchial disorder

Nasal Allergy

A common but not invariable accompaniment of asthma is nasal allergy Parents of asthmatic children often show surprisingly little interest in this problem, so great is their anxiety over asthma It is often the duty of the allergist to point out that nasal allergy is a first rate prob lem in its own right

As in asthma, the outstanding findings in allergy of the nose are mucosal edema, hypersecretion, and obstruc tion of the airway Itching and sneezing in nasal allergy are analogous to the wheezing and cough of bronchial allergy The symptoms vary considerably from patient to patient in degree and severity Frequent colds are a com mon complaint, and although many of these are allergic flares others are indeed infections

Examining the Nose

The physician treating allergic children should form the habit of looking in the nose of every respiratory case at every visit until the case is controlled Whatever skilled examinations belong exclusively to the rhinolaryngolog ist, the use of a head mirror and a nasal speculum should be familiar to all In nasal allergy the chief finding is edema The inferior turbinates are commonly tremen dously swollen and may be the only structures seen Their color is usually bluish gray, and an excess of clear or opaque mucus is a regular finding There are often large crusts of dry mucus The writer has formed the habit of making a diagramatic sketch of the degree of swelling of the inferior turbinates on the child s chart at each visit *These sketches* become useful in charting the progress of the case

asthma, but not uncommonly the two diseases occur at the same time. In infants, the face, especially the cheeks, is most likely to be involved, but in severe cases, virtually the entire body may be affected. In older children, the sites of predilection are the skin folds of the extremities but patchy involvement of the face, neck, and trunk are common. It is not at all unusual for eczema and asthma to be on the same etiologic basis.

Urticaria and Angioedema. If the patient is sensitive to a substance which causes urticaria or angioedema and develops asthma from the same cause, the asthma is likely to be very severe. One gets the impression in these cases that the child develops "urticaria of the bronchus" rather than ordinary asthma.

The Nervous System

Tension Fatigue. A behavior pattern marked by extremes of mental and physical activity is commonly found in asthmatic children.[illegible] As infants they are overactive, tense and sleepless. In older childhood, tension takes the form of irritability and such patients are inclined to act "spoiled," to be quarrelsome, peevish and resentful. Also with increase in age the tense behavior is accompanied by periods of listlessness, achiness and fatigue. It is most gratifying to find that this type of behavior tends to disappear as the allergic problems of the child are solved.

Migraine. It often comes as a surprise to those not acquainted with childhood ills to find that children not uncommonly suffer from migraine. In discussing the problem with adult sufferers, one often learns that they have had "sick headaches" as long as they can remember. There have been numerous reports[illegible] as to the allergic origin of this syndrome in children and the impression is growing that allergy is the outstanding cause. Since young

children cannot easily express themselves it often is re vealing to ask the child with cylic vomiting if he hurts anywhere Many times the child will reply that his head hurts!

Convulsions When anaphylaxis and allergy were new there was high hope that epilepsy would be found to be a disease of hypersensitivity This has not come to pass but at times convulsions will be found to be of aller gic origin The author has three asthmatic children under his care who have had generalized convulsions All are ex tremely allergic children and in two cases foods have been shown to be the source of the convulsions Chocolate is the cause in one egg in the other

The Gastrointestinal System

Foods which cause asthma often cause gastrointestin al disturbances as well Where such complaints appear without other cause they are to be considered of possible allergic origin and their source carefully sought

Diarrhea No bowel complaint is more likely to be of allergic origin than recurrent diarrhea Allergic diar rhea often begins in early childhood and many times the history will implicate the offending foods When the mother reports that a particular food caused diarrhea in infancy but the child has outgrown it this food should be considered very seriously as a possible cause of other allergic complaints including asthma

Abdominal Pain Any ailing child may complain of stomach ache much as an adult may complain of head ache and does so almost as commonly Where there is per sistent discomfort the trouble may often be traced to a food

Constipation The common expressions Boiled milk is constipating and That makes the cheese more

binding,' give a clue to a food which is a common cause of constipation It may be argued that the nature of the curd of cow's milk rather than allergy to this food causes constipation, and that may be true, but it is not an uncommon occurrence to find other foods responsible for the production of hard stools Flatulence is a common accompaniment of allergic constipation and other intestinal allergies

Foul Breath A common finding in childhood allergy is foul breath In some cases this seems to depend on poor nasal function, but in others, it seems to be a direct result of food allergy It commonly causes great concern to parents and it should be marked as a symptom to watch during the course of management of the more serious allergic manifestations It is at least partly because of this finding that anorexia is so common in allergic children

Other Gastrointestinal Manifestations Occasional findings in allergic children are vomiting bloating, geographical tongue, and aphthae or canker sores *Vomiting* is confined largely to infants the older child usually either 'outgrows' this manifestation or learns to avoid the offending agent *Bloating* is often mistaken for obesity but when the waistline rapidly diminishes during food elimination it is often found that relief of distension is the correct explanation *Geographical tongue*, like other disturbances of the digestive tract often disappears during the course of allergy treatment *Canker sores* often are caused by foods, toothpaste, or other substances taken into the mouth

The Genitourinary System

Although genitourinary allergy is not of outstanding importance, there are several annoying symptoms worthy of note Many allergic girls are given to vulva irritation

and pruritis Frequency of urination is a common complaint and enuresis may be present as well Probably most enuresis in allergic children has nothing to do with allergy but the possibility that it is due to allergic bladder irritation is to be considered Foods which are most commonly found responsibile for enuresis are citrus fruits tomato milk food dyes and black pepper

Miscellaneous Systemic Manifestations

The Blood As is well known eosinophilia is very common in allergic individuals According to Rinkel Randolph and Zeller[*] the leucocyte level in patients with food allergies is inclined to be labile and chronic leucopenia is common Anemia does not seem to be a symptom directly attributable to allergy

Hyperhidrosis Bowen has spoken of certain asthmatic children as wet sleepers When mothers become aware of the fact that hyperhidrosis can be a specific allergic reaction to foods they will often note that the eating of a certain food will invariably be followed by heavy sweats

Muscle Pains Pains in the large muscles especially those of the thigh and leg are common in allergic children The pain is characteristically worse at night and may be rather severe

Allergic Facies Where constitutional allergy is widespread poor color is common Patients often appear pale and listless with infraorbital discoloration and puffiness

Fever Although drug fever is fairly well known it is often overlooked that other allergens may produce acute or chronic fever[*] Acute fever is most common in infants and may be as high as 106 F or more The allergist sees several patients each year with fever due to a

lergy to foods

DIFFERENTIAL DIAGNOSIS

It is surprising how closely a number of other diseases may resemble asthma and it is the duty of the physician to rule out all conditions capable of producing a similar clinical syndrome He must be especially on his guard if the child has a history of asthma

In this section the most common conditions which may be confused with asthma will be discussed

(1) *Foreign Body in the Bronchus* This accident is a leading source of confusion in the diagnosis of asthma,* and because of its peculiar dangers deserves first consideration A history of choking on a particle of food or other object is often obtained, and there may have been subsequent coughing, difficult breathing and perhaps cyanosis Localized, unilateral expiratory wheezing is often heard and associated atelectasis or emphysema may be identified by physical examination and roentgenogram *The latter may show an opaque foreign body*

(2) *Bronchiolitis* An infectious process much like asthma and variously termed bronchiolotis, spasmodic bronchitis, asthmatic bronchitis, or capillary bronchitis occurs not uncommonly in infants It may, at least in some cases, represent the asthmatic response to infection and the possibility of later asthma should be kept in mind It is characterized by dyspnea, wheezing, cough, fever, and prostration As in asthma the wheezing is generalized, but it is usually much louder and coarser than that of asthma *In infants, bronchiolotis is undoubtedly the disease most* frequently confused with asthma, and in many cases a definite diagnosis must be deferred

(3) *Pneumonia* A coarse type of expiratory wheezing is sometimes found in bronchopneumonia, and,

especially if there is a previous history of asthma confusion may arise A useful early sign commonly appearing before the typical physical and roentgenological signs become manifest is flaring of the nostrils on inspiration If there is any doubt as to the presence of pneumonia it is an excellent plan to initiate pneumonia therapy

(4) *Bronchiectasis* Generally speaking the asthmatic wheezes while the bronchiectatic rattles but Field[illegible] reported wheezing in 33 per cent of a series of cases of bronchiectasis Where there is real doubt a bronchogram may be indicated

(5) *Croup* In infants it is not always easy to differentiate croup from asthma In both conditions respiration is labored but in croup the loud hoarse breathing will usually betray its laryngeal origin Where a child s airway threatens to become dangerously narrowed whatever the suspected cause no time should be lost in consulting a laryngologist

(6) *Fibrocystic Disease of the Pancreas* The infant with severe food allergies and the infant with fibrocystic disease of the pancreas may act very much alike both being given to digestive and bronchial difficulties

(7) *Congenital Laryngeal Stridor* This condition is ordinarily detected easily but when accompanied by nasal allergy it may produce a picture not unlike asthma

(8) *Congenital Heart Disease* Frequent attacks of bronchial infection with cough are seen in certain cases of congenital heart disease in which there is increased pulmonary flow Where a murmur is not obvious as in occasional cases of atrial septal defect these recurrent episodes may suggest asthma

(9) *Thymic Asthma* Although the thymus gland is currently considered of little if any importance in obstruction of the airway Glaser[illegible] warns It is desirable to keep

an organ ... with regard to possible disorders of a gland whose function is not known."

10 ... A functional type of ... ventilation is sometimes found in suggestible children who have seen a parent in an attack of asthma.* It should be remembered that in some cases the child may be ... the ... that precedes manifest asthma.

11) Nasal Obstruction. In infants, nasal obstruction may mimic asthma. An infant's tongue is relatively large and is held close to the palate, and when the nose ... a ... makes a poor substitute. The resultant struggle to breathe may be confused with the dyspnea of asthma.

Less likely possibilities in differential diagnosis are ... tuberculosis, Loeffler's syndrome,* foreign bodies in the esophagus, anomalous vessels, tumors, and ... cardiac asthma ... cases. The similarity of names has caused more confusion than similarity of symptoms. If it occurs in children it does so under conditions ... would not lead the physician to confuse it with asthma.

Chapter 3

ETIOLOGY OF ASTHMA: INHALANTS

Most substances finely enough divided to be carried in the air may act as inhalant allergens These may appear seasonally as is strikingly true of pollens and largely true of mold spores Others may be encountered at any time, and in this category are found animal epithelium, house dust, insecticides, and other household inhalants In adults there is scarcely any limit to the possibilities in this type of allergen, but children as a rule are exposed to relatively few inhalant contacts The inhalants commonly encountered in childhood practice are molds, pollens and house dust, and the relative importance of each is indicated in Figure 2 and Table I

POLLENS

Any plant which is wind pollinated (as opposed to insect pollinated) is a potential source of respiratory allergy In practice, however, only those pollens which combine the following characteristics will be found important [illegible]

(1) *Buoyancy* Corn pollen, for example, is of little clinical importance because it is so heavy that is does not travel over 200 feet from its source [illegible]

(2) *Antigenicity* (*Toxicity*) Pine is a heavy producer of buoyant pollen, but is apparently incapable of sensitizing

(3) *Productivity* Although crabgrass pollen is pre-

sumably buoyant and toxic, it is released into the air in such scanty quantity that it is of no importance in allergy

This section will be devoted to a discussion of pollens

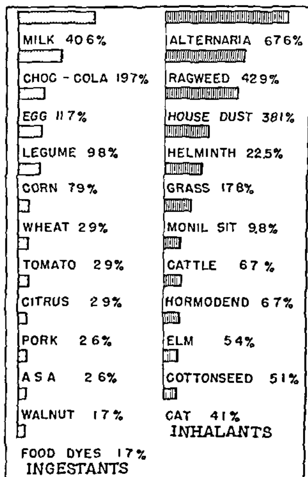


Figure 2 Incidence of Food and Inhalant Allergens in 315 Cases of Childhood Asthma Data on less common causes are given in Table I

TABLE I
INCIDENCE OF SENSITIZATION TO ALLERGENS AMONG 315 CASES OF CHILDHOOD ASTHMA

Inhalants	*Cases*	*Per Cent*
Alternaria	213	67.6
Ragweed	135	42.9
House Dust	120	38.1
Helminthosporium	77	22.5
Grass	56	17.8
Monilia Sitophila	31	9.8
Cattle Hair	21	6.7
Hormodendrum	21	6.7
Elm	17	5.4
Cottonseed	16	5.1
Cat Hair	13	4.1
Pyrethrum	11	3.6
Western Water Hemp	8	2.5
Feathers, Dog Hair	7	2.2
Russian Thistle*	6	1.7
Rabbit Hair	5	1.6
Kochia, Horse Hair	4	1.3
Silk, Orris Root	2	0.7
Ingestants		
Milk	128	40.6
Chocolate, Cola	62	19.7
Egg	37	11.7
Legumes	31	9.8
Corn	25	7.9
Wheat, Tomato, Citrus	9	2.9
Pork, A.S.A.	8	2.5
Food Dyes, Walnut, Pecan	6	1.7
Apple, Fish, Potato, Cinnamon	5	1.6
Beef, Plum Family, Grape	4	1.3
Cabbage Foods, Barley, Oat, Onion	3	1.0
Mint Family, Beet, Spinach, Bananas, Lamb, Pineapple	2	0.7
Cantaloupe, Shrimp	1	0.3

*Does not grow in Kansas City area; incidence is very high among patients from its habitat.

which have proved significant in allergy They will appear in their approximate order of importance

Compositae

The composite family includes such beautiful flowers as asters, zinnias, and crysanthemums, and such attractive weeds as goldenrod, dandelion, and daisy Since all these are insect pollinated they are not hay fever plants However, many composites have degenerated into wind pollination and in the process have become the allergic scourge of North America Included in this category are the numerous types of ragweed and sage There is considerable cross sensitivity among these plants

Ragweeds The term ragweed applies particularly to members of the genus which has been fantastically misnamed Ambrosia Included under this heading are small (common) ragweed giant ragweed, western ragweed, southern ragweed and others of less importance Although there are some who dissent, these plants are probably from a practical therapeutic standpoint antigenically identical Their importance rests on the fact that their *pollens are remarkable for their buoyancy, toxicity, and* productivity They particularly infest area of extensive agriculture, but one type or another is likely to be found almost anywhere

There are several other members of the ragweed tribe which are so closely related to the true ragweeds as to be either antigenically identical or nearly so Among *these are* burweed marshelder (prairie ragweed), rough marshelder, the false ragweeds, and cocklebur. Burweed marsh elder is in some dry areas the dominant ragweed, and should receive special attention where this is true. Cocklebur is a poor pollinator and is seldom considered of importance

Artemisia To the artemisia family belong the sages sagebrush and wormwoods and where these abound they should be given individual attention In areas where rag weeds are the dominant composites however Brier[11] feels that sage is probably of academic interest because it in teracts with ragweed pollen

Grasses

The most widespread source of pollen allergy not only in the United States but in the world is the grass family Of the thousands of species a comparatively small number possess the qualities necessary to make them im portant Their pollens are quite antigenic but fortunate ly are not as buoyant as those of many weeds and trees and do not usually appear in the air in heavy concentra tion

To the great simplification of the allergist s task most grasses cross react more or less perfectly For example the common lawn and pasture grasses blue grass timothy orchard grass and redtop are scarcely to be distinguished antigenically and some allergists use timothy exclusively for testing and treatment Two exceptions to this satis factory state of affairs are Bermuda grass and Johnson grass which interact poorly with other grasses[8]

Chenopods (Goosefoot Family)

The most important of the chenopods is Russian thistle a tumbleweed This great pest of the plains and Rockies is responsible for a tremendous amount of severe respiratory allergy wherever it is found A close relative is burning bush (Kochia scoparia) and although its pol len is apparently less antigenic than Russian thistle[2] it is nevertheless an important antigen Another common weed of this family is lamb s quarters but in children at

least, it is of dubious importance

Amaranths (Pigweeds)

This family furnishes a wide variety of prolific and noisome weeds Although much mentioned in the hay fever literature, skin reactions are rarely found, at least in the Kansas City area. The one exception is western water hemp, and since it flowers at about the same time as the ragweeds, failure to consider it may lead to poor results in late summer pollinosis

Trees

In view of their wide distribution and large pollen production, it is surprising that trees are not of more allergic importance than they are This may be because of their short seasons, or because they pollinate mostly in the early spring before houses are open Where the season is long, as is the case with oaks in certain mountain areas," they may be of considerable importance In cities where elms are plentiful, this pollen appears in enormous volume in late winter (Fig 4) and not uncommonly is responsible for severe respiratory allergy Mountain cedar has long been known as a source of severe pollinosis in parts of the Southwest

Other trees whose pollens appear on atmospheric slides are maple (and box elder), sycamore, pine, poplar (and cottonwood), pecan, mulberry, walnut, hickory, beach birch and others None of these have been found important in the Kansas City area

Other Plants

Among plants occasionally suspected in respiratory allergy are plantain, beet, dock, privet, rhubarb, acacia, buckwheat and mesquite Where the allergist finds these

pollens on his atmospheric slides he is justified in testing patients for them no matter how little attention they have caused in the hay fever literature On the other hand if he tests with them when they are either absent or none of his patients have symptoms at the time of their flowering he will confuse himself and waste much time and effort

An interesting hay fever plant is hemp (marijuana Cannabis) Over most of its distribution it is too scattered to be a significant factor but in the Omaha Nebraska area where it was once grown as a source of rope it has escaped from cultivation and become an important local pollen [illegible]

A baffling problem in extensive areas of the South is hay fever X [illegible] It occurs throughout the coastal plain and at last reports efforts to determine its etiology have been unsuccessful Unfortunately for its victims it is a common type of hay fever

Which Pollens are Important?

Although the whole subject of pollen allergy is complex the local situation in any given area is relatively simple It is the responsibility of each allergist to find out what his own problem is and to help him in this task he may draw on many excellent sources of information He often can get this information from allergists working in his area or he may consult Sampter and Durham s *Regional Allergy* [illegible] a very useful book which combines the collective experience of allergists working in all sections of North America He will learn much by looking about him and finding for himself the plants present in his community An excellent help in this endeavor is *Hay Fever Plants* by Wodehouse [illegible] Further information may be obtained from county weed control officers and from books on weeds grasses and other plants which these officers can

furnish or recommend For example the writer has found the following books of the greatest interest and assistance *Weeds of the North Central States* a publication of the University of Illinois Agricultural Experimental Station Urbana and *Weeds in Kansas* and *Grasses in Kansas* by Frank C Gates published by the Kansas State Board of Agriculture Topeka Watching the plants about him is one hobby the busiest physician can cultivate and enjoy

MOLD ALLERGENS

The discovery that soil fungi or molds are important inhalant allergens has been the most noteworthy develop ment in recent allergy history These organisms will grow in almost any place where there is sufficient moisture but their great reservoir is the soil They are important en vironmental allergens in areas of extensive agriculture in older houses in poorly drained areas and near bodies of water

The allergenic factor of most importance in mold allergy is the asexual spore or conidium but it has recent ly been demonstrated that the mycelium or vegetative portion of the fungus is antigenic as well These organ isms would be of limited interest if they acted only as en vironmental allergens Their real importance lies in the fact that their spores invade the air in force and during warm months constitute a seasonal allergic problem of the first magnitude

Important Molds

Alternaria There is general agreement that Alter naria is the most important fungus allergen in the United States It is a vigorous organism thriving under condi tions which discourage other molds In most areas it is active throughout the greater part of the year becoming

dormant only in the coldest weather In the South it may be present throughout the entire year

Alternaria has an interesting seasonal incidence (Fig 4) In the Midwest it begins to sporulate at the first sign of thaw in the late winter and continues to be a source of trouble from March through November Spores appear in the air at any time when the ground is not frozen, saturated with rain, or covered with snow Although prolonged dry weather has a tendency to inhibit this fungus even conditions of extreme drought do not stop its activity, and, in the Midwest, dry weather tends to give higher counts than rainy weather

Since Alternaria grows rapidly on vegetation, especially grasses, harvest time (June for Kansas wheat) and hay cutting time are occasions for high counts The combination of dead vegetation and fall winds makes October another favorite time for high counts

Hormodendrum Hormodendrum is closely related to Alternaria and similar in habit and growth It is especially prevalent in the spring, and on wet days it may exceed Alternaria in activity It is considerably less important in allergy than Alternaria

Other Molds

Of the thousands of species of soil molds, only a few appear in sufficient strength to be clinically significant [60,6] A common bread mold, Monilia sitophila is very active antigenically and is a common reactor Probably because their relationship to Alternaria is very close Helminthosporium, Spondylocladium, and Curvularia are common skin reactors, but, except for occasional showers ' their spore counts are low Also worthy of mention are Aspergillus, Penicillium Fusarium, Rhisopus, Absidia, Phoma, Mucor, Chaetomium, and Pullularia Baker's yeast and

brewer's yeast are of occasional importance in children One of the writer's mold patients has developed severe symptoms from stirring hot roll mix and from inhaling fumes from yeasty' beer Mold patients do not tolerate the drinking of beer or the eating of certain cheeses or other foods which contain fungi It should be noted that many present day cheeses are processed and do not contain molds

ATMOSPHERIC STUDIES

To obtain the best clinical results in pollen and mold allergy and to know one of the real pleasures of the practice of allergy the allergist will want to do his own air studies He may use a simple technique consisting of the daily study of greased slides which have been exposed each 24 hours in the open air, or he can use more highly perfected techniques suitable for research studies The writer's method which will be given below is a simplified adaptation of the standard method

Materials

The necessary materials for atmospheric study are (1) pollen shelter (2) glycerin jelly, (3) microscopic slides

The Shelter (Fig 3) The shelter used is modeled closely after the device designed by Durham It consists chiefly of two disks of galvanized sheet iron or other rust resistant material, 9 inches in diameter, held 3 inches apart by three bolts In the center of the lower disk a painted block of wood is fastened It is 1 inch high and has the dimensions of a glass slide Two thin metal clips hold the slide in place on the block The shelter is supported on a vertical pipe with a base or may be placed on a bracket The pipe is fastened to the lower disk and to a

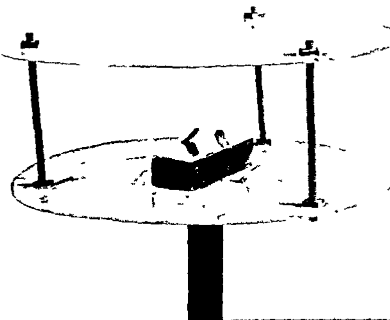


Figure 3 Pollen Shelter

base with floor flanges, obtainable from plumber s supply stores

The most accurate counts are obtained if the shelter is placed on the highest point of a tall building, but the practitioner is more likely to be faithful in his counting if it is placed outside a convenient window

Glycerin Jelly This material is prepared as follows Soak some gelatin for 2 or 3 hours in cold water pour off the superfluous water and heat until melted To 1 part of this add 1½ parts of glycerin and while still hot filter through spun glass pressed into the lower part of a heated funnel Add 2 or 3 per cent phenol Still keeping the mixture hot and fluid add drop by drop a saturated solution of methyl green in 50 per

cent alcohol until the glycerin jelly becomes fully as dark as green ink (The method given here is that of Brandt[10] The writer has succeeded in filtering with filter paper instead of spun glass)

Preparation of Slides A drop of melted glycerin jelly is placed on a slide and smeared to a thin film A number of slides may be prepared at one time and stored in a *covered* slide box Each morning a slide is labeled with the date and placed in the shelter

Counting Technique

The method of counting spores and pollen grains is much like that of the blood count[11] Instead of counting

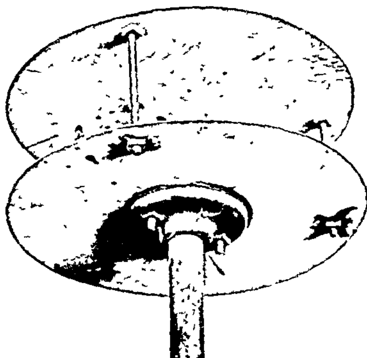


TABLE II

POLLEN AND MOLD CALENDAR

Kansas City, 1956

*February**	*March*	*April*	*May*	*June*	*July*
Alternaria	Alternaria	Alternaria	Alternaria	Alternaria	Alternaria
Hormodendrum	Hormodendrum	Hormodendrum	Hormodendrum	Hormodendrum	Hormodendrum
	Elm	Elm	Helminthosporium	Helminthosporium	Helminthosporium
	Maple	Maple	Oak	Pine	Grass
		Oak	Willow	Grass	Chenopod in north
		Willow	Cedar	Dock	Rusts
		Cedar	Poplar	Rusts	
		Poplar	Pine		
		Pine	Walnut		
		Walnut	Sycamore		
			Grass		

*Studies not done in January

TABLE II (Continued)
POLLEN AND MOLD CALENDAR
Kansas City 1956

August	*September*	*October*	*November*	*December*
Alternaria	Alternaria	Alternaria	Alternaria	Alternaria
Hormodendrum	Hormodendrum	Hormodendrum	Hormodendrum	
Helminthosporium	Helminthosporium	Helminthosporium		
Grass	Grass	Grass		
Chenopod amaranth	Chenopod amaranth	Chenopod amaranth		
Ragweed	Ragweed	Ragweed		
Rust	Rusts	Hemp		
Composites	Composites			
	Hemp			

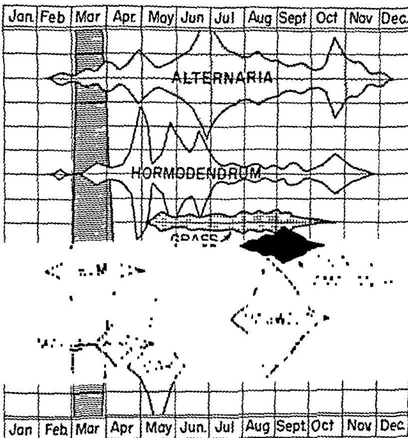


Figure 4 Mold Pollen Count, Kansas City 1956 Weekly Averages Distance between horizonal lines represents 10 pollen grains or spores For calendar showing minor pollens and spores see Table II

elements in squares, however the pollen mold count includes all elements found in the low power field during five trips across the short dimension of the slide The examiner places the slide in the stage with one end under the objective He begins the count at the upper edge and

completes it at the lower He moves a short distance along the slide and repeats the same process in the opposite direction After a total of five such trips across the slide the count is complete The total of each type of grain or spore seen makes up the mold and pollen count for the day Pollen counts are tabulated and kept in graphic form as shown in Figure 4 For a more complete list of seasonal allergens, see Table II

Identification of Pollens and Spores There is no better way for the beginner in air studies to become familiar with air borne substances than to acquire known specimens and mount them in glycerin jelly In Figures 5 and 6 microphotographs of common pollens and spores are shown Further material on this subject may be obtained from the work of Durham and McKay, Wodehouse, Brown, Christiansen and Swaebly, or the standard textbooks of allergy

NONSEASONAL INHALANTS

Inhalants to which a patient may be exposed at any time are known as nonseasonal inhalants This is not a strictly accurate designation, as there is some difference in exposure according to the time of the year, but in this group we do not find the striking periodicity characteristic of pollens and molds Included under this heading are farm and industrial inhalants and such household allergens as animal furs, house dust, and insecticides This section will be devoted to a discussion of this class of antigens

House Dust

A remarkably potent allergen is produced as a result of the aging and degeneration of cotton and other organic materials For want of a better term, this substance, a fine

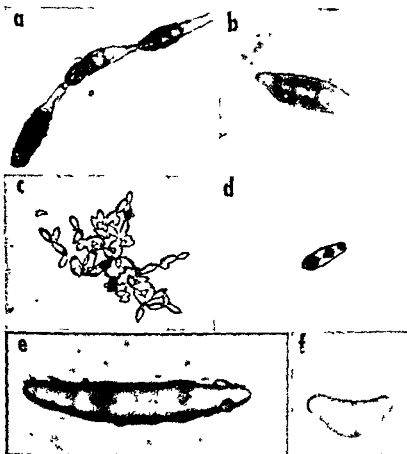


Figure 5 Common Mold Spores (a) Alternaria The spores are often seen in chains of two to four or more but are usually seen singly as in (b) (c) Hormodendrum Spores are usually in groups usually some five to ten to the group Spores vary considerably in size (d) Helminthosporium small size (e) Helminthosporium usual size (f) Spondylocadium The spore shown in (d) is from a culture all others are from atmospheric slides (x640)

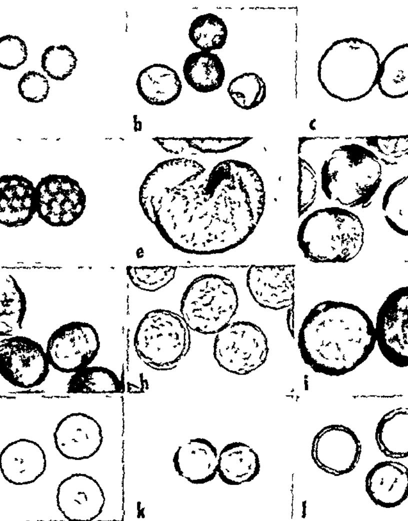


Figure 6 Common Pollen Grains (a) Ragweed (b) Hemp (Cannabis) (c) Grass (d) Russian thistle (e) Pine (f) Maple (g) Oak (h) Elm (i) Hickory (j) Cedar (k) Sage (l) Poplar (x640).

gray powder is called *house dust* It occurs in all houses to a greater or less extent and has been found in all climates It is a very common offender in adults and although less commonly seen in children it is still an antigen of considerable importance House dust sensitivity is very prevalent in lower income groups because of greater exposure to old furniture and old living quarters In winter when houses are closed and furnaces are busy it is especially important It is produced in abundance from mattresses pillows stuffed furniture and to a considerably less extent from stuffed toys lint and books

Animal Epithelials

Among the most potent inhalant allergens are the epithelia of mammals including hair and dander The feathers of birds are less active allergens but are of definite importance Because dogs and cats are such common house pets these two sources are of first importance in childhood

Source of Epithelials The child who is sensitive to cats and dogs will have difficulty not only from sharing a house with them but in some cases may have symptoms from hair attached to the clothing of playmates or react to the presence of these animals on outdoor contact Farm contact accounts for most cases of allergy to horses cattle and other stock but clothing of those handling animals may affect extremely sensitive children Rug pads made of cattle hair are an occasional but important source of cattle hair allergy Feather pillows comforters and feather beds are both epithelial and house dust contacts Rabbits are sufficiently common as pets to constitute a minor allergic problem Because of the fact that they are carefully cleaned before use wool (in fabrics) and horse hair (in furniture) do not seem to be active antigenically

Miscellaneous Inhalants

Pyrethrum. Pyrethrum, an insecticide, is a common and active allergen. It is manufactured from the flower of a plant closely related to the ragweeds, and since the commercial product contains pollen it is a common offender in ragweed sufferers.

Cottonseed. Although cotton fiber is nonantigenic, the seed may cause the most severe allergic reactions. Sensitive patients have symptoms from sleeping on unprotected mattresses and from contact with certain cattle feeds. Cottonseed meal is sometimes used in the manufacture of candy and in baking, and is a menace to patients highly sensitive to this antigen. Cottonseed oil, on the other hand, is considered antigenically inert by most allergists.

Orris Root. This active allergen was formerly much used in cosmetics, but few patients now react to it. Its source is the rhizome or root stock of an Italian iris.

Silk. The return of silk to common use is bringing this antigen back into prominence. It is used in scarves, Japanese jackets, suits, and in many other ways. Silk is of insect origin and allergy to it may be related to allergy to moths, May flies, etc. In the vicinity of large bodies of water such as the Great Lakes, insect emanations may be important seasonal inhalants. Allergy to these inhalants is detected and treated in the same way as with pollens and molds.

Tobacco Smoke. Many children complain when exposed to heavy concentrations of tobacco smoke. In most cases the smoke probably acts as a primary irritant, but in others it acts as a true antigen.[20] It is probably never necessary to completely exclude asthmatic children from the presence of tobacco smoke, but it is wise to see to it that

they are not exposed to the heavy concentrations often found at parties, in closed cars, etc

Less Common Inhalants

Other inhalants which have been reported are karaya gum, goat hair, hog hair, insect emanations, flaxseed derris root (rotenone), smuts and rusts guinea pig hair white rat and mouse hair, wheat flour, kapok gum acacia fish glue, castor bean dust, coffee bean dust wood shavings, saw dust None of these is common in pediatric practice, but in puzzling cases or special situations, these and others may need to be considered

Chapter 4

ETIOLOGY OF ASTHMA: FOODS, DRUGS, INSECT BITES, NONSPECIFIC FACTORS

FOOD ALLERGENS

In view of the fact that allergic children become sensitive to inhalants on the basis of relatively casual contact, it is not surprising that their heavy exposure to foods leads to a great deal of food allergy. This exposure to foods is overwhelming in infants. For example, a 15 pound baby taking 1 egg yolk and 1 quart of milk daily (as many do) may be compared to a 180 pound man on a daily intake of a dozen egg yolks and 3 gallons of milk! When we further consider the evidence that the gastrointestinal tract of infants is permeable to a foreign protein, we may well wonder that food allergy is not more common and important than it is.

Which Foods are Important?

Any food seems to be capable of sensitizing, but there are several which are encountered with especial frequency. Generally speaking, the leading allergens are common foods like milk, grains, legumes, and eggs, but certain others like chocolate, nuts, cinnamon, and crustaceans seem to owe their importance to high inherent antigenicity. In Figure 2 and Table I, the relative importance of foods in asthmatic children is shown.

The Biological Relationship of Foods

Nothing has clarified our understanding of food allergy more than the discovery that foods which are members of the same botanical or zoological family tend to interact antigenically[**] In this section the various food families and their members are listed It will be noted that allergically speaking the terms fruit vegetable protein, greasy food, sweets seafood rich food starchy food' spicy food, etc have little or no place As allergens foods are classified according to their place in the plant and animal kingdom only In the next chapter we will see how this relationship becomes useful in determining which foods are important in asthma

The following Food Families list is the one which the writer gives to the mothers of children with a food allergy problem

Food Families

Allergy to one member of a family of foods often means allergy to other members This is especially true of many families (pea family citrus family) but less so of others (mammal family)

Apple Family Apple pear quince

Aster Family Lettuce is most common Others are chicory endive escarole artichoke dandelion sunflower seeds tarragon (Ragweed and sage belong to this family also the insecticide pyrethrum)

Beet Family Beet spinach chard lamb s quarters (Hay fever plants in this family are Mexican fireweed and Russian thistle)

Blueberry Family Blueberry huckleberry cranberry

Buckwheat Family Buckwheat rhubarb garden sorrel

Cashew Family Cashew pistachio mango

Chocolate Family Chocolate (cocoa) and cola

Citrus Family Orange lemon grapefruit lime tangerine kumquat citron

Fungus Family Mushroom and yeast (The molds that cause inhalant allergy belong to this family Also antibiotics)

Ginger Family Ginger cardamon turmeric

Gooseberry Family Current and gooseberry

Grains (Cereal or Grass Family) Wheat corn rice oats barley rye Also wildrice cane millet sorghum bamboo sprouts (The hay fever grasses belong to this family)

Laurel Family Avocado cinnamon bay leaves sassifras

Mallow Family Cottonseed and okra

Melon (Gourd) Family Watermelon cucumber cantaloupe pumpkin squash and other melons

Mint Family Mint peppermint spearmint thyme sage horehound marjoram basil savory rosemary balm (melissa) catnip

Mustard Family Mustard turnip radish horse radish watercress and varieties of cabbage The varieties of cabbage are cabbage chinese cabbage broccoli Brussel sprouts collards kale cauliflower kohlrabi and rutabaga

Myrtle Family Allspice guava clove pimento (not pimiento)

Onion Family Onion garlic asparagus chives leeks sarsparilla

Palm Family Coconut and date

Parsley Family Carrot parsnip celery parsley celeriac Also the following spices anise dill fennel angelica celery seed cumin coriander caraway

Pea (Legume or Clover) Family Peanuts Peas (green field black eyed) Beans (navy lima pinto string soy etc) Less important are licorice acacia tragacanth

Plum Family Plum cherry peach apricot nectarine wild cherry almond

Potato Family Potato tomato egg plant peppers This family includes all foods called pepper except black and white pepper such as green pepper red pepper chili pepper paprika pimiento cayenne capsicum (Tobacco belladonna stramonium and hyoscyamus belong to this family)

Rose Family Strawberry raspberry blackberry dewberry and such developed berries as loganberry youngberry boysenberry etc

Walnut Family English walnut black walnut pecan hickory nut butternut

Animal Kingdom·

Mollusk Family Oyster clam abalone mussel

Crustacean Family Crab lobster shrimp

Fish Family All true fish either fresh water or salt water such as salmon tuna sardine catfish trout crappie etc etc (Fish sensitive patients often cannot handle or otherwise come in contact with fish glue like LePage s)

Bird Family All fowl and game birds chicken turkey duck goose guinea, pigeon, quail pheasant etc

Although egg belongs to this family it does not seem to be related to chicken allergy except the meat of laying hens may cause trouble in egg sensitive cases

Reptiles These are eaten very little but it is interesting that both turtle and rattlesnake meats are available The frog an Amphibian is not a common food

Mammal Family Beef pork lamb rabbit squirrel venison etc Cow s milk is of the same animal origin as beef and there is a slight tendency for those who are milk sensitive to be allergic to beef Most persons allergic to cow s milk cannot take the milk of other animals such as the goat

Foods Without Relatives·

The following foods are the only members of their botanical family which are commonly used as foods in the United States Arrowroot banana black (white) pepper Brazil nut capers chestnut chicle coffee elderberry fig grape hazelnut (filbert) honey juniper flaxseed karaya gum maple sugar New Zealand Spinach nutmeg (mace) olive oregano papaya pineapple persimmon poppyseed saffron sesame seed sweet potato tapioca tea vanilla wintergreen water chestnut

Mineral Kingdom·

Many flavors coloring agents medicines etc are of mineral origin Pop Koolade Popsickles Jello and candies are artificially colored and flavored Occasional trouble is caused by these agents

Aspirin is the most important medicine causing allergic reactions It is found (usually under the name of acetylsalicylic acid) in a wide variety of preparations like A P C Anacin Bufferin Alkaseltzer

The medicines used in allergic children seldom cause allergic reactions but if any seem to cause trouble they should be watched

From this outline you can see that there is no such thing as being allergic to all nuts seafood fruits starches greasy foods spices etc

Notice that these are not related

tuna and shrimp
white potato and sweet potato
wheat and buckwheat
black and red pepper
crab and clam
raisin (grape) and prune (plum
peanut and other nuts
almond and other nuts

	coffee and tea
	ginger clove and cinnamon
Notice that these foods *are* related	apple and pear
	peach and plum
	pea bean peanut
	wheat corn other grains
	beet and spinach
	chocolate and cola drinks
	onion garlic asparagus
	cucumber and melons
	walnut and pecan
	carrot and celery

Sources of Foods

A number of workers have patiently and efficiently compiled detailed lists of food which are the source of various common antigens These lists are very useful for adults who must eat in restaurants but in childhood practice the writer has found it more practical to give the mother a general list of sources and encourage her to learn to read labels on food packages Since mothers are experts on foods they can be very easily taught to keep a child on a diet which is safely free from the food being avoided and if the allergist makes certain that she understands that this avoidance must be total he will find that he need have no fear as to her role in diet studies General lists of food sources are to be found under "Food Testing" page 64

DRUG ALLERGENS

Although drug allergy is not of outstanding importance in childhood asthma, the possibility that either prescribed drugs or patent medicines may act as allergens is to be kept in mind Easily the outstanding drugs to watch *in the asthmatic child are aspirin and penicillin* As is true of allergy to insect bites (see below), allergy to drugs often acts more like anaphylaxis or serum sickness than

clinical allergy or atopy [illegible] That is to say drugs are more likely to produce urticaria rashes arthralgia or fever than asthma eczema rhinitis or migraine

Aspirin Aspirin has the distinction of being the most common drug in modern use but it also is the most common childhood poison and in asthma at least the most common drug allergen[illegible] Aspirin asthma is invariably severe and since the drug is routinely given for childhood colds attacks due to aspirin are commonly thought to be a result of the cold It is wise to discourage aspirin in asthmatics and where its use is allowed it should be carefully watched The writer routinely forbids it in severe cases

Penicillin Penicillin has become a very important allergen especially in dermatology Bronchial reactions are by no means rare however and the asthmatic who gives a history of any type of allergy to penicillin should not be given this drug[illegible]

Other Drugs Brown lists the following drugs as those most commonly associated with bronchospasm acacia aspirin ACTH anesthetic agents antihistaminic agents argyrol the arsenicals atophan atropine asthma powders cocaine cortisone derris root demerol digitalis emetine heparin insulin iodides[illegible] ipecac curare gum liver extract lycopodium the mercurials morphine pantopon para aminosalicylic acid penicillin pollen extracts privine pyromen sera streptomycin sulfonamides[illegible] taka diastase tannic acid tetraethylammonium bromide thiamine and vaccines Although the introduction of diphtheria and tetanus toxoids has greatly reduced the indications for its use horse serum remains an extremely dangerous agent in susceptible children An asthma patient of the writer died in another city minutes after being given antitetanic serum No history was taken prior to

injection and no skin test was made

The physician who is sparing and cautious in his use of drugs will save his families and himself a great deal of trouble Many drugs in overdosage are poisons and all are potential allergens Arsenic deserves special mention because of its current use as a specific in asthma and its dangers need the strongest emphasis

ALLERGY TO INSECT BITES

As Loveless and Fackler have pointed out sensitization to insect venoms is more in the nature of anaphylaxis or serum sickness than atopy This means that the normal individual is probably as likely to become sensitized as the allergic individual and that the reaction will be one of severe edema rather than true asthma The asthmatic child with his sensitive lower respiratory tract however would seem more likely to react with edema of the glottis or with pulmonary edema and such a case should be viewed with the greatest respect and caution

Prevention The principle of avoidance applies strongly in the field of allergy to insect stings Any child who gives evidence of any type of hypersensitivity to insects should be taught to avoid places where bees and wasps abound It is wise to avoid the planting of outdoor flowers flowering shrubs and clover in the yards of patients with bee sensitivity The child should also be prevented from playing about old sheds muddy places basements and other areas frequented by wasps

Treatment of the Reaction The treatment of a severe insect reaction is identical with that of the management of a constitutional reaction to hyposensitization (page 91)

Desensitization True desensitization is possible in insect allergy Glaser in a modification of the method of Mueller and Hill recommends beginning with a 1 to

1 000 000 dilution and working up cautiously to 1 to 10 He recommends 3 years treatment Swinny[m] whose experience is extensive advises prolonged follow up of patients to make certain that there is not a gradual return in sensitivity

NONSPECIFIC CAUSES

Infection

Easily the most important nonspecific factor in childhood asthma at least in infants is infection [*] Its role is so important in fact that it has been argued that bacteria act as specific antigens in asthma It is true as we have seen in Chapter 1 that infection is a very common trigger mechanism and it is also true that asthmatic children are often much given to colds and other respiratory infections but attempts to demonstrate the specific etiologic role of bacteria in asthma are not conclusive Any child with an infection amenable to treatment should be treated for it of course and this is eminently true of a child already ill with asthma If the physician wishes to use bacterial vaccines he may justify himself with the contention that they may be nonspecific stimulators of the immune mechanism Crump has reported good results in resistant cases from the use of vaccines made from bronchoscopic culture[a] It has long been suspected that focal infection may play a role in childhood asthma and this point of view has found a strong advocate in Chobot [*] However most workers find that surgical removal of lymphoid tissue or other tissue in an effort to remove focal infection is not effective[m] There is in fact a suspicion that removal of tonsils and adenoids may act as a stimulus to the development of respiratory allergy in susceptible children

Primary Inhalant Irritants

Any substance which is irritating to the normal

respiratory mucosa may act as a nonspecific factor in childhood asthma.[illegible] Of particular importance are materials used in interior decoration such as paint, varnish, shellac, lacquer, linseed oil, turpentine and other thinners, ammonia, and paint removers. These and a long list of similar substances can contribute to the development of an attack of asthma. It would be impossible to list all the other sources of irritation, but among them are: soap powder and detergents, insecticides, menthol, camphor, ether, tobacco smoke and other smokes, saw dust, perfumes, sulfur trioxide and dioxide,[illegible] hydrogen sulfide, cleaning fluids, flower odors, food odors,[illegible] kerosene, gasoline, formalin, and illuminating gas. Some of these act as allergens rather than as simple irritants, and in any given situation it is often impossible to say which mechanism prevails.

It is remarkable how often primary irritants combine with allergens to upset allergic balance. Cases like the following, a hypothetical one, are not uncommon:

> A child sensitive to house dust, Alternaria, and the ragweeds is well controlled. During the Labor Day weekend his father undertakes to redecorate the living room. In the process of removing wall paper and hammering on mop boards he stirs up a large volume of house dust and molds. He uses ammonia to clean woodwork and with a sander raises a cloud of wood dust and old paint. He uses a paint remover to loosen a heavy layer of varnish from a door and uses fish glue to repair it. The paint, an unusually odoriferous product, is thinned with turpentine and stretched with linseed oil. While at work the amateur decorator solaces himself with large, black cigars. By the time the job is finished the air has been sufficiently polluted to fill any allergist's heart with horror, and being done at the height of the ragweed and Alternaria season, the child is exposed far beyond his tolerance and goes

into a severe attack of asthma A case of this type shows not only the importance of inhalant and irritant avoidance, but the necessity of thorough indoctrination of the families of asthmatic children

Physical Factors

Thermal Factors An important factor in childhood asthma is temperature change Many children are especially intolerant of chilling, and at the first visit, the mother may object to the child being disrobed for examination and testing An occasional patient reacts similarly to being overheated Whether thermal reactions are actually allergic phenomena (physical allergy) or nonspecific factors is not settled, but since the patient who is properly controlled tends to gain tolerance to thermal factors, the latter view seems more probable [64]

An interesting form of thermal intolerance is seen in the patient who wheezes after laughing, exercise, crying or other activity which increases the respiratory exchange In some cases this is a result of the extra load on the limited vital capacity, but in others it seems to be a result of a large volume of cold air being drawn into the bronchi

Humidity Humidity has often been suspected of being a deleterious factor in asthmatics and it often proves to be According to Markow and Reicher [65] however, most patients apparently intolerant of damp weather are so because in the rainy season in the East the mold count is often high Dry climates are often advocated for asthma, but according to Perlman,[66] Very low relative humidities can be harmful in a more subtle way because of the drying of the mucous membrane ' Probably the best answer to the effect of moist air and dry air lies in the unexplained fact that some patients best tolerate humidity, others aridity

whose asthma began early and whose attacks are severe and frequent will of course be likely to have multiple allergies and react slowly to treatment

Possible Allergens At the beginning of a survey of allergens the mother is asked if she suspects any food of causing asthma Although the allergist is seldom fortunate enough to get such a history it is well worth the asking The infancy history is of the greatest importance as the allergic baby often reacts violently to food allergens and many of these are permanent sensitizations A history of eczema feeding problems and newborn breathing difficulties (nasal or bronchial) may be of the greatest help in identifying such offenders as milk egg citrus fruits and others

Careful questioning about housing conditions house pets type of bedding and reactions to house dust smoke and other inhalants is in order If the physician knows the seasonal incidence of pollens and molds for the previous year he can often correlate the history with pollen and mold peaks It will help the mother remember the date of flare ups if she is asked How was he on his birthday on Memorial Day on the Fourth of July Hallowe en night the Christmas holidays? His birthday for example may have happened to coincide with the peak day of the Alternaria season and his mother may reply He had an attack which ruined his birthday party Flare ups during the Christmas season raise the question of allergy to evergreens house dust (on stored decorations or a result of careless holiday house cleaning) or a seasonal treat like chocolate or pecans

Systemic Allergic Manifestations Careful investigation of systemic manifestations does two things First it gives information which will help in finding the causes of asthma For example if the investigator finds that the

child has a history of diarrhea from milk he may later find that the child has a latent sensitivity to this food which becomes manifest as a cause of asthma when he has a cold Second it gives him the chance to relieve other allergic complaints Parents who have become resigned to minor eczema headache or behavior problems are glad to see that the physician is very much interested in these problems as well

Non allergic Manifestations While the child is under the close observation coincident to the management of asthma an excellent opportunity is presented for the discovery of other pathology The allergic history should include non allergic factors in its scope

The History Form

Since no one will remember all points of an allergic history a prepared history sheet is used Not only is this necessary for completeness but as an important record to which the physician can refer at any time Nothing will shake the family s faith in the allergist (which after many false starts and lost hopes is often shaky enough already) than for him not to be instantly aware of all important phases of the history It is a mistake to keep a precise record of skin tests and laboratory tests many of which may be of no value whatever and hide an important point in the history in a mass of record

The history sheet used by the writer is shown in Figure 7

SKIN TESTING

The selection and number of skin tests depend on geography and the physician s preferences Perhaps no two allergists not sharing the same office use quite the same selection In Figure 8 the skin test form used by

Encircle outstanding findings Underline other significant findings

Infancy	Colic Vomiting	Eczema Diarrhea	Blocked nose Constipation
Nose	Blocking	Discharge	JAN FEB MAR APR MAY JUN
	Sneezing	Freq URI	JUL AUG SEP OCT NOV DEC
Chest	Cough	Asthma	JAN FEB MAR APR MAY JUN
	Pneumonia	Croup	JUL AUG SEP OCT NOV DEC
G I	Anorexia Vomiting	Pain Constip	Diarrhea Foul breath
Skin	Urticaria	Eczema	
C N S	Tension	Headache	Fatigue
Misc	Enuresis	Hyperhidrosis	
Inhalants	House Dust Molds	Cat Smoke	Dog Insecticides
Foods	Apple Apricot Aspirin Banana Barley Bean Beef Beer Beet Broccoli Cabbage Carrot Cauliflower Celery Cherry Chicken Chocolate Cinnamon Coconut Coffee Cola Corn Cucumber Egg Fish Food colors Grape Grapefruit Lemon Lettuce Melons Milk Nuts Oat Onion Orange Pea Peanut Peach Pear Pecan Pepper (green) Pepper (black) Pineapple Plum Pork Potato Rice Shrimp Spinach Strawberry Sweet potato Tomato Walnut Wheat		

Figure 7 Allergy History Record

1	2
Cattle Hair	Cottonseed
Cat Hair	Parakeet Feathers
Dog Hair	House Dust
Feathers mixed	Kapok
Horse Hair	Pyrethrum
Rabbit Hair	Silk
3	**4**
Orris Root	Tobacco
Aspergillus	Helminthosporium
Alternaria	Hormodendrum
Chaetomium	Monilia Sitophila
Fusarium	Penicillium
Grain Dust	Mucor
5	**6**
Burweed Marsh Elder	Red Oak
Elm	Russian Thistle
Mixed Grasses	Ragweed mixed
Kochia	Western Water Hemp
Johnson Grass	Apple
Bermuda Grass	Banana
7	**8**
Beef	Cashew
Black Pepper	Chocolate
Navy Bean	Egg
Cabbage	Grape
Carrot	Corn
Chicken	Milk
9	**10**
Onion	Pecan
Orange	Shrimp
Peanut	Tuna
Peach	Wheat
Pork	Yeast Baker's
Potato	Tomato

Figure 8 Skin Test Form

the writer is shown, and this may be used as a guide in selecting extracts Extracts should be arranged in the rack so as to correspond with their order on this sheet

In allergic skin testing, the extracts may be injected into the skin (intradermal or intracutaneous test) or applied to a superficial scarification (scratch or cutaneous test) There are advantages to both methods, but in pediatric practice at least, the scratch test is preferred In investigative work, the skin of a donor who has been given intracutaneous injections of serum from an allergic patient is sometimes tested (passive transfer test) but this is of no practical value in the study of childhood asthma*

Intracutaneous Test

The writer uses the intracutaneous test very little Although it sometimes is more accurate than the scratch test it is also considerably more painful, and has been the cause of constitutional reactions leading to death** It must never be used unless a preliminary scratch test has shown the particular antigen to be a reactor of very low intensity, and it should be remembered that the traditional 0 10 cc of the tuberculin test and other intracutaneous tests is far too much Only enough to blanch a tiny area of the skin (about 0 02 cc) should be used

Scratch Test

Experience has taught that the most reactive and accessible areas for skin testing are the upper back and the lateral aspects of the upper arms The area to be used is gently washed with alcohol or Zephiran (If the skin is rubbed roughly it may temporarily reduce its reactivity) As nearly as possible the child should be handled in a manner least likely to frighten him, because a frightened child often reacts poorly, probably because of an increase

in circulating epinephrine Many times the child must be tested repeatedly until he overcomes his fear of the pro cedure

The scratch may be made with any sharp instrument from a common pin to a small lancet The scratch should not cause bleeding but should be deep enough to be vis ible For several years the writer and his associates have used the Morrison microscratcher* exclusively and its convenience and painlessness and the uniformity of its scarifications make it the instrument of choice It con sists of two main parts a rotating core with two sharp points at the end and an outer casing (Fig 9) The core rotates by spring power and the device is cocked by ro tating a knurled knob at the end opposite the scratching points When the cocked scratcher is pressed against the skin the points rotate sharply making the scratch

After the child is prepared for testing the micro scratcher is adjusted so that the points are just visible as the physician sights across the end of the instrument Ex perience will show whether this is the correct setting and in any event the first scratch should be observed for a moment to see if the scratch is the correct depth In in fants and others with thin sensitive skins special care must be observed to avoid too deep a cut After the re quired number of scratches have been made a small amount of extract (a large drop is wasteful and likely to 'run) is applied to each scratch according to its place in the rack Twenty to thirty tests are sufficient for one sit ting, and in infants a dozen is often enough

After 10 to 20 minutes depending on when the re actions seem to be at their peak the tests are read The reaction produced by the allergen is a wheal or hive sur rounded by an area of erythema There is usually con siderable itching If a small wheal appears which definite-

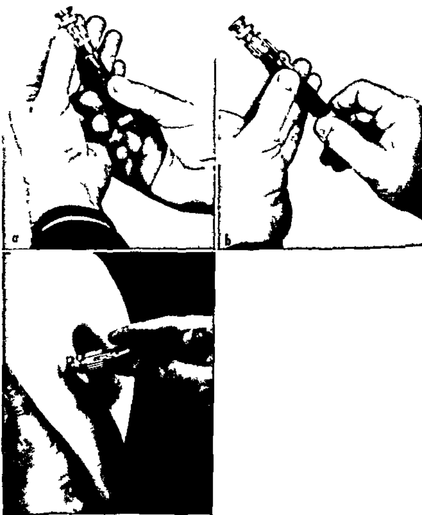


Figure 9 Morrison Microscratcher in Use (a) Setting depth of

ed by turning knurled end clockwise (c) Making the scratch by pressing scratcher against skin A skin marking pencil or ballpoint pen is used to mark location of scratch

ly extends beyond the circular scratch the reaction is re corded as 1 plus If there is a large wheal 1 cm or more in diameter the reaction is recorded 4 plus Intermediate wheals are labeled 2 plus and 3 plus accordin„ to their intensity Although erythema and itching corroborate the reaction it is the wheal that determines the reading

Significance of Skin Reactions

Inhalants Few tests in medicine are more accurate than skin tests for inhalant allergens Allergy to pollens molds and the various epidermals and dusts may be de tected accurately by either scratch or intracutaneous tests A test need not be strong to be significant If the history is positive for this antigen a borderline reactor may usual ly be tentatively regarded as a factor in the case It is here that an intracutaneous test may be of help

There are occasional exceptions to the rule that in halants are dependable skin reactors False positives may be obtained at times because of an overreactive skin these can be detected by comparing the reaction with that of other antigens or a control At times the patient may have developed respiratory allergy before the skin be comes reactive Buffum[8] has pointed out that this is com mon in infants Another exception to the rule that inhal ants are good reactors is dog hair[46] For some reason it is often negative in children definitely known to be do„ sensitive

Foods as Skin Reactors In view of their great im portance in allergy it is most unfortunate that foods are poor skin reactors[49] Not only do known offenders com monly fail to react but quite innocent foods often give false positive reactions One is tempted to give up skin testing for foods altogether but not infrequently the solu tion of a case of asthma is greatly hastened by the appear

ance of good skin reactions to foods Skin testing for foods is somewhat more efficient in eczema than in respiratory allergy, and the child with associated eczema deserves the help that this method of testing may bring

THE CLINICAL TESTING OF FOODS

The failure of skin testing to furnish an accurate means of identifying food allergens has forced the de velopment of clinical or dietary methods of testing There are several techniques, but all are based on the clinical response to food elimination and refeeding

When to Test Foods

In severe asthma the writer begins food testing at the first visit In milder cases especially where the history suggests pure inhalant sensitivity, testing is delayed until it appears that inhalant treatment is not adequate for complete relief It is often necessary to test common foods several times One reason for this is the difference in food tolerance in the various seasons and another is the fact that asthma in the early weeks or months of management is occasionally so severe that a minor food allergen may escape detection

Selection of Foods For Testing

There are several considerations which govern the choice of foods to be subjected to clinical testing The following criteria are useful in making the choice

(1) A food with a history of causing any type of al lergic reaction at any age should have first consideration For example a child who gives a history of prolonged colic or other feeding problem' should be suspected of milk allergy [20] while an early history of vomiting egg places this food under heavy suspicion

(2) A marked craving for a particular food may be evidence of allergenicity

(3) Marked antipathy to a food in all forms sugges allergy to that food

(4) Sensitivity to a particular food may be a family trait and when the mother remarks none of us can eat eggs or none of us can stand milk the mentioned food is under some suspicion

(5) A strong skin reaction to a food allergen calls for clinical corroboration False positives in foods are common

(6) If none of the above clues to food sensitivity proves useful foods should be tested in the order of their incidence as allergens in childhood allergy (Fig 2) It is of course a waste of time to test a food which the child seldom or never eats

Technique of Clinical Food Testing

The method of food testing used by the writer is a modification of the Rinkel Individual Food Test Foods are usually eliminated for four days but any foods giving especially suspicious histories may be eliminated for 3 or 4 weeks while minor suspects are given 4 day studies If feasible the child is examined shortly before the test again on the last day of abstinence and finally on the day following the return of the food to the diet The mother has the responsibility of maintaining the dietary restrictions and of observing the child s symptomatic response to food manipulation The form shown in Figure 10 is given to the mother marked with the symptoms to be observed and foods to be eliminated Its use is explained in the opening paragraph of the form She is also given a diet diary form (Fig 11) so that a record of foods and symptoms may be kept

Figure 10 Elimination Diets

Eliminate the foods marked below for a period of — days During the last two days of the diet elimination see if the symptoms which are underlined below disappear or improve On the last day or two of the diet elimination I will want to see him and again a day or two following the return of the food

Symptoms Cough wheezing clearing the throat blocked nose runny nose headache muscle aches excessive sweating constipation diarrhea stomach ache foul breath tension fatigue bed wetting

1 *Milk* Milk buttermilk ice cream sherbet ices cheese cottage cheese custard and all creamed foods such as cream gravies soups potato dishes creamed vegetables butter oleo and most baked foods including bread (Most children are not so allergic to milk that slight traces such as occur in butter will cause trouble but during testing the diet should be completely free of milk

2 *Chocolate and Cola* Chocolate cocoa coca cola Pepsicola and all carbonated drinks containing cola extracts

3 *Grains* (a) Wheat Breads breaded foods breakfast cereals cream sauce flour macaroni spaghetti noodles crackers cookies gravies ice cream cones pancakes waffles bran pretzels cake doughnuts and anything made with flour Rye bread and corn bread contain wheat and occasionally wheat is found in chili canned meats or fried foods etc

(b) Corn meal corn syrup (most candy cookies canned fruit cough syrup chewing gum) canned corn corn on cob popcorn crackerjacks hominy beer grits fritos corn cereals tamales tortillas and many other Mexican foods

(c) Oats (d) Rice (e) Rye (f) Barley (including malt) are used mostly in breakfast cereals

4 *Egg* Ice cream (some brands) some noodles noodle soup meringue custard meat loaf French toast mayonnaise frostings some salad dressings croquettes icings some candies fritters Almost all baked goods are made with egg exceptions being ordinary bread buns crackers and baby cookies Be on your guard for foods containing even the slightest trace of egg because it must be *completely* eliminated

5 *Beans Peas and Peanuts* Remember to take away peanut butter chili and candies made with peanuts or peanut butter

6 *Potato Tomato Egg Plant Peppers* Tomato is found in many such mixed dishes as chili sauces salads salad dressings catsup pork and beans etc Watch for potato in soups and as potato chips and sticks

Figure 10 Continued

7 *Citrus Fruits* Orange lemon lime grapefruit tangerine citron kumquat
8 *Apple Family* Apple (cider cider vinegar apple pectin jellies) pear quince
9 *Plum Family* Plum prune cherry peach apricot nectarine almond

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CASE STUDY

The following case study is presented to illustrate the procedure used in working up a case of childhood asthma Since the sucessful solving of an asthma problem calls for the collection of a great deal of information this will be a rather long report However none of the findings listed are without value in a proper understanding of the case The history is given in the way given by the mother in conversational language and in the present tense

History

A 6 year-old boy first seen July 7 1953 has as his chief complaint asthma The apparent age of onset was 3½ years Attacks occur the year round but are more severe and frequent in cold weather and are becoming more severe and hard to relieve with the passage of time

Infancy The patient was started on breast feeding and gained weight satisfactorily However he was so fussy that it was felt that he was not satisfied and he was weaned to an evaporated milk and corn syrup formula The baby s fussiness became worse when he was weaned and the formula upset him in almost every way There were frequent forceful vomiting constipation and a mild face rash Numerous feedings were tried all of which were based on cow s milk (dried evaporated or fresh) but there was little difference among them The vomiting

Date									
1									
Breakfast									
2									
Lunch									
3									
Supper									
4									

Figure 11 All foods eaten are listed according to meal and symptoms are recorded as to time of occurrence before breakfast (1) after breakfast (2) after lunch (3) and after evening meal (4)

ceased at about 6 weeks but colic persisted up to about the seventh month During the first year there were several attacks of diarrhea which although not severe were inclined to resist treatment As nearly as his mother can remember, he has never been entirely free of nasal stuffiness even as a new baby

Nose For most of his life especially during the winter the child has suffered with colds sore throats and ear infections Even when apparently free of a cold he often rubs his nose and is compelled to breathe for the most part through his mouth His tonsils and adenoids were removed at the age of 4 and for several months his mouth breathing was somewhat improved Last year he developed typical hay fever beginning about the middle of August and lasting until frost

Chest Asthma has been perennial but worse in winter Comparison of the time of summer attacks shows that they correspond to known Alternaria peaks The attacks are almost always severe and may last as long as 5 or 6 days Oral medication including cortisone has seemed to be of little help Coughing is confined largely to asthma attacks but at times there will be a troublesome night cough without obvious asthma

Inhalants The mother suspects house dust largely because she herself sneezes when cleaning house and because when the child is in the cellar the stirring up of dust causes sneezing and cough

The child gives a suspicious mold history He always sneezes when his father cuts the grass and he has had a similar reaction to raking leaves and playing in dirt Once during a visit to a farm he came down with severe asthma after playing in a grain bin

There are no pets in the home and he is not in contact with other birds or animals He has used a foam rubber pillow for the past year and a half He always sneezes when his mother uses either a moth spray or mosquito spray

Gastrointestinal System The child is a poor eater but has been somewhat better the last year He craved milk during his second year of life and got to the point where he would take little else This did not concern his mother because she felt that milk was the perfect food and that as long as he drank plenty of it he needed nothing else At about two and a half the family doctor found the child to be quite anemic and suggested that he be cut back on his milk intake Since then the child has shown less and less interest in milk but his mother insists that he take a glass at each meal

The child frequently has foul breath especially in the morning His mother thinks perhaps this accounts for his poor appetite for breakfast

Skin The child has no present skin allergies As noted there was apparently mild facial eczema the first months of life During his second and third winter there was mild eczema of the forearm and arm folds He had a severe attack of hives at the age of four but the cause was not determined

Nervous System The child s mother states that he is very nervous He is inclined to be cross and moody and if he doesn t get his way he will have tantrums some of which are rather severe At times especially mornings he is listless and complains of tiredness and leg ache When he was 2 or 3 years old he would often have severe leg pains at night At the same stage he was a very poor sleeper and much of this seems to have been because of leg ache

Miscellaneous The patient has always been a heavy sweater but this is less noticeable in the past year or two He is inclined to urinary frequency and is given to occasional enuresis

Physical Findings

The general appearance of the patient is one of chronic ill health He appears listless and irritable The

face is pale with dark circles of discoloration below the eyes He is of asthenic habitus and has a slouching posture

Head The tonsils are absent The nasal mucosa is pale and of a grayish hue The inferior turbinates are so swollen as practically to fill the anterior nasal cavity Both tympanic membranes are lusterless and retracted

Chest The rib cage is normal On ordinary breathing no abnormal sounds are heard but on forced expiration diffuse wheezing is heard There are no definite signs of emphysema

Abdomen and Extremities Negative

Laboratory Findings

WBC 6 800 56 polys 37 lymphs 5 eos 1 mono Hb 13 gm Urine negative Tuberculin negative

Chest Roentgenogram Negative except for slight increase in peribronchial markings

Nasal Smear Scattered throughout the smear are numerous eosinophiles about 15 per cent

Differential Diagnosis

Nothing was turned up in history physical examination or laboratory to suggest disease other than asthma A probable diagnosis of asthma was made and an allergy study continued

Skin Tests

The significant reactors were Alternaria ragweed elm cat hair pyrethrum navy beans peanuts wheat Because of a borderline reaction to house dust an intradermal test was done which was negative

Clinical Food Tests

In view of the patient s stormy infancy milk was withdrawn for a period of 1 month Because of positive

skin tests to legumes (peanuts and beans) and wheat these foods were subjected to four-day elimination tests Wheat was negative While off legumes the patient seemed to feel better in every way slept better and coughed less While abstaining from legumes his nose was less congested and had better color All findings became worse on a return to peanuts and beans The test was repeated with the same result

At the end of a month milk was returned to the child s diet During abstinence he was unquestionably better His nose was less congested he ate better and felt better On the night of returning to milk he developed a rather severe attack of asthma His parents have refused to allow a refeeding of this food and the child himself shares their feeling

Treatment and Follow Up

(Strictly speaking these two phases of management belong to Chapters 7 and 8 but they are so inextricably bound to etiologic diagnosis they will be discussed as the case report continues)

Hyposensitization Treatment with Alternaria ragweed and elm extracts was begun injections being given *twice weekly the first 2 months weekly until* December monthly through deep winter and then back to weekly injections Minor reactions necessitated temporary cut backs in treatment twice during the early stages of treatment

Avoidance Milk and legumes were to be avoided strictly The mother was carefully instructed in the sources of both categories She was also carefully instructed in the avoidance of all common inhalants including those giving a negative skin test Calcium wafers were prescribed

Follow up After the first 2 months or so there were no attacks of asthma Nasal stuffiness came under control much more slowly and there was more or less resid

ual congestion throughout the first year During the second year of management nasal symptoms continued to improve to the point where there was no significant nasal blocking After 3 years of treatment the child was dismissed as controlled

WORKING OUT THE CAUSE OF ASTHMA IN INFANCY

The management of asthma in infancy does not differ radically from the management of the disease in older children but there are a few points that justify special consideration In infants for example there must be more care in differential diagnosis Asthma often acts more like bronchitis or whooping cough[*] than asthma while other diseases like *foreign body in the bronchus* or fibrocystic disease of the pancreas mimic asthma Also the small air way and mucus producing tendency of infants makes for peculiarly *severe attacks* Finally *the dominance* of food allergy in infancy colors the working out of the etiology of the case[*] Most asthmatic infants later develop inhalant sensitivities *and this calls for frequent retesting in* such cases

Since infants are worked up in the same general way as older children *much the same routine* of history taking and skin testing is used but in the following case study the differences in the work up are illustrated

Case Study, Infantile Asthma

Present History A 9 month-old infant boy is brought in because of frequent spells of choking up coughing and wheezing *His mother states that he always has a* rattling in the throat and that about every two or three weeks he chokes up and wheezes for two or three days at a time At times these attacks are preceded by a cold at other times they come on without warning usually at night Two attacks have been so severe that the child s

lips became blue and he had to be taken to the hospital for treatment in an oxygen tent There seems to be no change in intensity of attacks at various seasons

Previous History Delivery was uneventful and the infant was a normal full term infant He had no obvious difficulties with his formula but his mother says that he has always been a fussy infant At about the age of 4 months he seemed to be more irritable than he had been previously and his mother thought he might be having stomach ache from cereals She tried changing cereals and found that he was less irritable on rice and oats and she felt that mixed cereal (especially) and barley upset him His stools were frequently loose for several days at a time

Besides cereals the child has been fed all vegetables fruit egg yolk mashed banana baby cookies and beef His mother does not feel that any of these make him irritable

Inhalants The family are living in a new house and there are no house pets The infant sleeps on a plastic covered mattress and he has no pillow or stuffed toys He is seldom out of doors and is no worse after being taken out

Physical Examination At the time of examination the child did not have active asthma The nose seemed blocked but very little mucus was obtained on aspiration and in the smear there were neither eosinophils nor other cells The chest was negative

Skin Tests The infant was tested for house dust Alternaria Hormodendrum mixed grasses ragweed milk egg oats rice wheat barley apple peach green beans peas carrot sweet potato egg orange and chocolate All skin tests were negative

Diet Manipulation From the history there was doubt as to the compatibility of milk and cereals Because of this these foods were eliminated In an effort to isolate other possible causes vegetables and fruits were given on

separate days on a 3-day rotation The child was given a soy milk formula *sweetened with cane sugar* The mother was instructed to keep a diary of foods given and associated symptoms

Progress Four days after being placed on his diet the child was entirely free of asthma None of the foods of his rotated diet seemed to cause trouble and rotation was discontinued after 9 days and at the end of 2 weeks he was returned to milk He remained free of asthma until being given wheat in the form of crackers and wheat cereal He was kept off wheat for a week and at the end of that time was given barley cereal The giving of barley was also *followed by asthma In the succeeding 6 weeks it was* found that he was unable to eat any of the cereals (wheat corn rice oats and barley)

Follow up The child developed a persistent cough at the age of 18 months Skin tests were negative but when the cough persisted and the child developed a nasal discharge he was re-examined At this visit he was found to have eosinophiles in his nasal smear and a skin test was positive for Alternaria He has been kept on Alternaria hyposensitization for the past year and has remained well He has a permanent intolerance to wheat and corn

Comment This case demonstrates how much the working out of an asthma problem depends on follow up At first glance it appeared that milk was a factor but it happened that cereals were taken out at the same time as milk It should be remembered that although milk is the great offender[20] in childhood food allergy beans including soy beans are not infrequent sources of trouble (Fig 2) If the infant had continued to have difficulty after a change to a soy milk meat base formula would have been indicated A beef base formula is available commercially or it can be prepared as follows[8, 77]

STRAINED MEAT FORMULA

Strained beef pork lamb chicken	1 cup
Corn oil	3½ tablespoon
Granulated sugar	2 tablespoon
Tapioca starch or flour	2½ tablespoon
Calcium carbonate (buy 4 oz)	1 teaspoon
Table salt (not iodized)	1 teaspoon
Water	1 quart

Heat water in the top of a double boiler until the water in the outer boiler starts boiling Add the salt sugar and calcium carbonate Mix the starch to a paste in 1/3 cup of water and stir into the water in the top of the double boiler Cook mixture for 10 minutes stirring constantly Then add the strained meat and oil Mix thoroughly and cook ten more minutes

Chapter 6

TREATMENT OF THE ASTHMATIC ATTACK

GENERAL MANAGEMENT

A child in an attack of asthma represents much more than a problem of simple bronchial obstruction He is *often dehydrated* and weary he may be *ill with* infection and he is almost certainly very much afraid It is well for the physician to proceed on the assumption that all these *factors are present or impending and to give direct at*tention to each If he proceeds to do so in an optimistic and confident manner the child and his parents will sense that relief *is in sight and the aura of anxiety surrounding* the case will greatly diminish

When first seen the young patient will often be found to be breathing rapidly and jerkily This type of respiration represents the hyperventilation of fear and the child s first need is gentle reassurance The writer has found the following maneuver useful The child is asked to watch the doctor who then proceeds to breathe slowly and not too deeply with plenty of time for expiration He is directed to breathe in this more deliberate way and to take plenty of time in emptying his lungs The slower rate is more efficient and by avoiding deep inspiration the child avoids the trapping of air resultant emphysema The child is then ready for therapy directed toward re lieving the obstructed airway

Whether the patient is treated at home in the hos

pital, or in the doctor's office, he is placed at rest in a quiet place. Such sources of inhalant allergy or irritation as tobacco smoke, house dust, menthol and camphor fumes from vaporizers, etc., are eliminated. Hot liquids like tea and broth usually have a relaxing effect, and if the child is not vomiting these are to be encouraged. Common allergens such as milk, chocolate, aspirin, cola drinks, and egg are best withheld even though they are not known *offenders in the particular case. The very fact that the* child is in an attack is presumptive evidence that all factors have not been identified![1] An enema often is beneficial, perhaps because it removes intestinal gas which may interfere with contraction of the diaphragm.

DRUGS

Epinephrine

The dose of epinephrine for a 150 pound man is 0.5 cc., and hence it is proper to give 0.10 cc. for each 30 *pounds of body weight. This should, in fact, be consider-*ed the maximum dose and often half or two thirds as much is fully as effective. By using smaller doses the physician is free to repeat injections as often as every 20 to 30 minutes for two to four injections. So as to allow for precisely accurate dosage, a tuberculin syringe is used for administration and the use of a 26 needle will almost entirely obviate pain. The home administration by a member of the family is recommended by Bowen,* frowned on by Segal.[5] The writer has found this practice wise *in an occasional case.* Most patients have a nurse neighbor who will be glad to accommodate in the task. It is not a bad plan to give the patient a note or card on which his dose is written. This will allow administration by an emergency room house physician without *the danger of over*dosage.

It is important that overdosage be avoided as in improper doses there is likely to be very distressing tachycardia and tremor[**]

Aminophylline

The physician will have no trouble remembering how much epinephrine and aminophylline to give a child if he remembers that the adult dose of 1 1 000 aqueous epinephrine is 0 5 cc and the adult dose of aminophylline is 0 5 gm Here however the resemblance ends Epinephrine is given subcutaneously and may be repeated rather frequently while aminophylline is best given intravenously or rectally[**] and must *not* be repeated at frequent intervals The physician who has given aminophylline intramuscularly is not likely to do so again as the pain is intense It is poorly absorbed when given by mouth but is used occasionally for minor symptoms Intravenous administration must be slow

Like epinephrine aminophylline in overdosage is dangerous[**] and it is well to adhere to the dosage of 100 mg to each 30 pounds of body weight It must also be remembered that the drug has a cumulative action and it is wise to space dosage at 12 hour intervals

Other Drugs

Ephedrine Although very useful for minor asthmatic symptoms ephedrine has little if any place in a severe attack[**] It is not effective in severe asthma and it may lead to numerous unpleasant side effects particularly excitement sweats and indigestion Levin[**] has mentioned its occasional tendency to produce depression It may be given alone or in combination with aminophylline antihistaminics or barbiturates The adult dose is 25 mg

Iodides Potassium iodide occasionally finds use as an

expectorant It probably is most useful following the more severe stages of the attack The dose recommended by Overall is three daily doses of the saturated solution of potassium iodide each dose equaling in drops the age in years

Sedatives It is the writer's feeling that the only sedative needed in asthma is the comforting presence of solicitous adults *The child needs an awareness of what is going on so that he may understand and cooperate* The barbiturates are more likely to excite than calm him and if the physician sees the need of sedation he may use Benadryl or chloral Morphine is the most dangerous of all drugs which have been used to bring rest in asthma being a respiratory depressant The writer has not used ataractic (tranquilizing) drugs since seeing one of his asthma patients develop severe shock after rectal chlorpromazine

TABLE OF DRUGS USED IN ASTHMA

Drug	*Dose 30 lb Child*	*Frequency*
Epinephrine 1 1 000	0 10 cc subcut	q 20 30 min for 3 or 4 doses
Aminophylline	0 1 gm I V	q 12 hr as long as needed
SS KI	3 drops by mouth	t i d as long as needed
Ephedrine	5 mg by mouth	q 4 hr p r n
Cortisone	25 75 mg by mouth	q i d 4 or 5 days
ACTH Gel	10 40 units I M	daily 4 or 5 days

DEHYDRATION

Since persistent vomiting is a regular complication of severe asthma, dehydration and acidosis must often be given serious consideration Many times the 'toxic' appearance of the patient depends more on dehydration and fatigue than on the asthma itself, and fluids may be the child's greatest need As Levin has pointed out, the dehydrated child may have diminished glycogen stores, and since chlorides are depleted by vomiting, the appropriate

solution for routine use would appear to be 5 per cent dextrose in saline or Ringer s lactate solution Segal[7] reports excellent results with plasma in patients with severe peripheral vascular collapse Since aminophylline must be given slowly an intravenous infusion makes an ideal vehicle for this drug

INFECTION

Infection is a common and treacherous problem in asthmatic attacks especially in infants It may be the precipitating factor a complication or a little of both At times especially in young children what appears to be asthma may turn out to be bronchiolitis or bronchopneumonia Since exact differential diagnosis may be imposs ible antibiotics should not be withheld

STATUS ASTHMATICUS

In asthma of young children failure to respond to treatment usually indicates that infection is present but in older children uncomplicated asthma may prove resistant and the term status asthmaticus is properly applied The real basis for success in these cases is proper application of the measures already discussed but at times other treatment is indicated

Oxygen When it is seen that an attack of asthma is likely to be severe or prolonged oxygen will often greatly relieve the tiring patient This is especially true in infants and if given in a Croupette the combination of oxygen and cold steam is often dramatically effective The addition of carbon dioxide 5 per cent seems to be of value as the gas is both an expectorant and respiratory stimulant Segal[7] recommends that continuous oxygen not be used longer than 18 hours

Gamma Globulin Bowen[8] has recommended the use

of gamma globulin in resistant asthma in doses of 5 cc every month. Although there is no evidence of lack in gamma globulin in allergy, many asthmatic children seem to respond to this treatment.

ACTH and Cortisone. It is always comforting to have something in reserve in the management of a disease which may at times become very severe, and ACTH and the adrenocortical steroids fill this need. Unfortunately they are widely used in lieu of specific treatment, a role for which they are poorly adapted. They are limited not alone in efficacy, but in safety, and current thinking may be summarized in this statement of Levin,[illegible] "Treatment with these hormones is never a substitute for thorough allergic study and search for specific etiologic factors with subsequent specific avoidance or desensitization. For this reason we limit the use of these drugs to short term therapy of 3 to 5 days for acute asthmatic episodes when the measures already outlined have not been successful in terminating an attack." He finds ACTH gel the agent most likely to give prompt relief, and recommends the following dosage for a child of 5 years:

1st day	20-40 units
2nd day	20 units
3rd day	10-20 units
4th day	10 units if necessary
5th day	10 units if necessary

In a recent paper, Rackemann[illegible] states that the steroids cannot replace more simple and less dangerous drugs, and adds that once started they are hard to stop. In speaking of prednisone and prednisolone he says that their total effect, both good and bad, is not very different from hydrocortisone.

WHAT NOT TO DO IN ASTHMATIC ATTACKS

A few prohibitions that have been found useful in

teaching are these

(1) Never use morphine

(2) Use the smallest effective dose of all drugs

(3) Do not use Coke syrup to control vomiting in allergic children

(4) A calm manner on the part of attending adults is the best sedative

(5) Penicillin allergy is common in adults unusual in children rare in infants When in doubt as to infection in infants penicillin should be given but if there is no reasonably good indication in older patients do not use it

(6) Don t criticize the parents if their failure to follow directions brought on an attack The allergist who is patient and tolerant in his dealings with the family will find the family patient and tolerant with him

(7) Don t overlook dehydration

Chapter 7

SPECIFIC TREATMENT

The treatment of the asthmatic attack as discussed in the last chapter is non specific and should be part of the therapeutic equipment of every physician who treats children In this chapter we will be concerned with specific allergic treatment a type of therapy in which the physician who undertakes the permanent relief of the disease must be proficient

The specific treatment of asthma is divided into two phases *avoidance* and *hyposensitization* Where complete avoidance is possible (as in foods and certain inhalants) no other treatment is required Where inhalant avoidance is impossible (as in pollen house dust, and mold allergy) hyposensitization is indicated

AVOIDANCE OF INHALANTS

Avoidance of Atmospheric Inhalants The allergic individual is to a large extent at the mercy of atmospheric inhalants, and unless he is able to retire to a climate devoid of the guilty pollens and spores, the best that he can hope for is partial avoidance At times it is practical for an individual to move from an area where a particularly toxic pollen such as ragweed is prevalent, but it must be kept in mind that he may very well develop a sensitivity to another pollen in his new home Even if it were commonly successful, the practice of children being moved to an area where counts of all pollens are low has the serious

disadvantage that the child is from then on a prisoner of climate and may not in adult life be free to live where he wishes

Even when being hyposensitized the patient with allergy to pollens and molds should not expose himself to any greater concentration of the offending antigen than necessary Remaining indoors is of considerable help to such patients and where efficient air conditioning is available this is quite practical if it does not too greatly limit the patient s duties and recreation The child who sleeps in relatively pollen and mold free bedrooms and spends some of his daytime hours indoors will better tolerate the load of antigen he must contend with at other times

Avoidance of Household and Other Environmental Inhalants The writer keeps a copy of the picture shown in Figure 12 hanging in his offices and clinics This cartoon was designed to demonstrate clearly to patients and families the sources of environmental inhalants It will be seen that sources of house dust molds and other allergens and primary respiratory irritants are illustrated In the basement are seen wet moldy walls soap powder saw dust moldy and dusty papers (picked up by children in paper drives) An old style furnace with its cold air shaft and heat pipes is shown so that the parents may see how is should be kept clean In the room above are shown the dust forming mattress stuffed toy pillow and stuffed furniture Various dust catchers are shown including shelves drapes cornices books and rugs Primary irritants illustrated are paint perfume ammonia insecticides etc Other antigens included are dog cat feathers pyrethrum tobacco smoke kapok cotton seed and cattle hair rug pad Hanging on the wall is a farm scene in which are illustrated horse and cattle and such sources of mold as straw hay barns chicken houses etc This illustration



Figure 12 Common Household Inhalants For discussion see text

has been found useful in indoctrinating families in the mysteries of inhalant allergy and is kept hanging in plain view as a reminder of the importance of continued vigilance in avoidance

AVOIDANCE OF FOOD ALLERGENS

As in inhalant allergy avoidance of food allergens is a part of both treatment and prophylaxis When a food has been identified as a definite allergen it is good practice to order its complete removal from the diet for one month As Rinkel[*] has found abstinence from a food tends to increase tolerance and after a month some children can tolerate the food every 4 or 5 days If tolerance has not been gained the fact is quite obvious to the parents and often to the child and the food will be recognized as a food for which the child has permanent intolerance

The duty of the allergist extends to the avoidance of future sensitizations Our knowledge of the biological relationship of foods teaches us to encourage caution in allowing a patient to eat foods closely related to those to which he is sensitive For example the child found sensitive to corn is well advised to avoid excessive use of other grains It is also well to caution against the excessive use of foods and drugs which seem antigenic by nature such as chocolate citrus fruits egg fish nuts aspirin and penicillin

HYPOSENSITIZATION

Theoretically the degree of clinical sensitivity to any inhalant allergen may be reduced by the parenteral administration of extracts of the offending substance In practice this procedure is largely limited to house dust molds and pollens but it is of occasional use in other in

halants such as dog hair. Physicians beginning to work with allergic people are commonly confused by discussion of low dosage, high dosage, titration, etc As to dosage and serial dilution tests or titrations, most allergists will agree with Peshkin[5] in believing such tests have not been shown to rest on fundamental and scientific evidence and serve only to add confusion and false assurance In any event, the way of knowing when the patient is sufficiently hyposensitized depends on the clinical experience with treatment of the patient in his particular environment

In practice most allergists begin with a dose which is low enough to be safe, and proceed with caution to reach 'maximum tolerated dosage within the bounds of comfort and safety for the patient'" As Withers once pointed out to the writer, the patient who has constitutional reactions may have no positive skin reactions at all The writer once attempted hyposensitization in the case of a dental assistant with a positive ragweed history and a completely negative skin test Even with the most extreme dilutions the patient produced frightening constitutional reactions

Preparation of Treatment Set

There is a great deal of variety in the methods of preparing extracts for use in hyposensitization To avoid confusion, the writer will present only his own method but those interested in other techniques including those involving preparation of concentrates from crude materials may consult one of the standard textbooks of allergy

The *pollen* extracts used are the standard 1 10 concentrates obtainable through firms marketing allergic extracts The *mold* extracts are "Type 33," developed by the Association of Allergists for Mycological Investigation and obtainable from *the Hollister Stier Company* The *house*

TABLE III
DILUTION OF ALLERGY EXTRACTS

1 *Pollens* (1 10)
To 1 cc of concentrate ad 1 9 cc saline This is 1 100
To 1 cc of 1 100 ad 1 4 cc saline This is 1 500
To 1 cc of 1 500 a 3d 4 cc saline This is 1 2,500
To 1 cc of 1 2 500 add 4 cc saline This is 1 12 500
2 *Type 33 Molds* (1 100)
To 1 cc of concentrate add 9 cc saline This is 1 1 000
To 1 cc of 1 1 000 add 4 cc saline This is 1 5 000
To 1 cc of 1 5 000 add 4 cc saline This is 1 25 000
To 1 cc of 1 25 000 ad 1 4 cc saline This is 125 000
3 *Efron H se Dust* (1 40)
To 0 1 cc of concentrate add 9 9 cc saline This is 1 4 000
To 1 cc of 1 4 000 add 4 cc saline This is 1 20 000
To 1 cc of 20 000 ad 1 4 cc saline This is 1 100 000
To 1 cc of 100 000 add 4 cc saline This is 1 500 000

dust concentrate is that developed by Efron and obtainable from the Endo Company

The strongest dilutions used in our offices and clinics are pollens 1 100 Type 33 molds 1 1000 and Efron dust 1-4 000 The writer has not found stronger dilutions of advantage although children can usually tolerate allergic extracts in the greatest concentration

In Table III the method of diluting extracts is outlined Diluting is done with a sterile syringe and the diluting extract is ordinary buffered saline The individual doing the diluting should be in a room to himself so

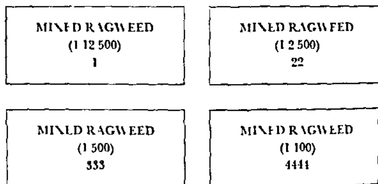


Figure 13 Labeling of Pollen Treatment Set

that there is no chance of a mistake being made because of distraction or interruption It is important that the vials be labeled carefully and since treatment may be given not only by the allergist, but by his assistants referring doctors other doctors assistants etc it is wise to label the vials so that there is scarcely any chance of the dosage being misunderstood *Although the strongest dilution is the first dilution, it is not given first!* It is our practice to label the vials according to when they are used and therefore the weakest is number 1 We use two further safeguards we label the bottle with the actual strength and to give emphasis that bottle 4 is the strongest four numerals are used Three are used for bottle 3 two for bottle 2 and one for bottle 1 For example a ragweed set is labeled as shown in Figure 13

The bottles may be labeled according to any system that will make certain that the relative strengths of the dilutions will be understood by the least experienced individual into whose hands these potent extracts may fall The method given here has proved practical and safe but

any method which will make certain that there is no confusion in dosage may be used

Hyposensitization Schedule

Patients are begun on 0 03 cc of the weakest dilution and are treated with doses representing increases of approximately 50 per cent until a maintenance dose is reached (Table IV) This is usually 0 25 cc of the strongest dilution but if the child exhibits persistent intolerance (local or constitutional reaction) at a lower dose the usual maintenance dose is just below the dose which is not tolerated Injections are best given twice weekly until control is achieved but where this is not practical they may be given weekly When the maintenance level is reached the patient is treated once a week during the period when the antigen to which he is sensitive is active and every 3 to 4 weeks at other times It is wise to cut the dose of potent pollens like ragweed and Russian thistle in half during the height of the season as full doses may cause reactions or accentuation of symptoms

Precautions in Hyposensitization

Allergy extracts are potent agents and the physician needs to be familiar with their dangers As all useful drugs are potent however he should not be afraid of them An occasional patient reacts violently to injections and a knowledge of prevention and treatment of these reactions is very important The causes of reactions are (1) over dosage and (2) accidental entry of a vein

Local Reactions At the site of the injection there will often be more or less itching a small wheal and mild erythema This is *not* to be considered an untoward reaction If an area of edema 2 cm or more in diameter appears however this is to be considered a mild local re

TABLE IX

TREATMENT SCHEDULE IN HYPOSENSITIZATION

Bottle I (1 12,500 pollen 1 125,000 Type 33 mold 1 500 000 Endo *house dust*

1st dose	0 03 cc
2nd dose	0 05 cc
3rd dose	0 07 cc
4th dose	0 10 cc
5th dose	0 15 cc
6th dose	0.25 cc

Bottle 22 (1 2,500 pollen 1 25,000 Type 33 mold 1 100 000 Endo house dust)

7th dose	0 05 cc and work up to
11th dose	0.25 cc

Bottle 333 (1 500 pollen 1 5 000 Type 33 mold 1 20 000 Endo house dust)

12th dose	0 05 cc and work up to
16th dose	0 25 cc

Bottle 4444 (1 100 pollen 1 1 000 Type 33 mold 1 4 000 Endo house dust)

17th dose	0 05 cc and work up to 0.25 cc top dose

Note In patients who cannot take the full dose of 0.25 cc of the strongest dilution the highest dose they can tolerate becomes the maintenance dose

action In severe local reactions, the entire lateral aspect of the upper arm may swell

Constitutional Reactions This alarming reaction, which is fortunately uncommon, may take several forms The patient may develop asthma or there may be multiple areas of urticaria, itching under the chin and between the scapulae, sneezing, pallor, cold sweats and prostration Coma and death are not unknown

Prevention of Reactions To prevent reactions the physician attempts to avoid (1) exceeding tolerance (2)

accidental overdosage and (3) accidental entry of a vein

(1) *Avoiding Exceeding Tolerance* Especially if doses are being increased the patient or his parent is asked about any previous reaction After the injection the patient should remain in the vicinity of the office or clinic for about 20 minutes

(2) *Avoiding Accidental Overdosage* The old rule used in eye medication may be applied here Check dose and dilution before drawing in into syringe before injection and immediately after injection

(3) *Avoiding Accidental Entry of Vein* This accident should be carefully avoided The precaution of drawing back on the plunger of the syringe should be followed It is wise to use a 24 or 25 gauge needle as a smaller needle may not allow reflux of blood

It is a good practice to keep on hand a package of red adhesive stars to affix to the treatment record of any patient who has any type of untoward reaction Once a patient has had a treatment reaction of any type drop back to two or three steps below the point where the reaction occurred and increase thereafter with caution

Treatment of Reactions

Treatment is usually not necessary for local reactions but patients so reacting should be kept in the office for about 20 minutes to be certain they are not in an incipient constitutional reaction If there is doubt it is best to proceed as if a constitutional reaction is present

The patient having a constitutional reaction is made to lie down and a light tourniquet is placed above the site of the injection He is given epinephrine (aqueous 1 1000) 0 10 cc for each 30 pounds of body weight in the injection site and the same dose in the other arm An antihistaminic is given by mouth The patient is kept in

the office until recovered Further treatment, if necessary, is given along the lines of management of the asthma attack, page 75

How Long is Hyposensitization Continued?

There is no easy answer to this question Generally speaking, mold and pollen treatment should be continued 1 full year after control is adequate In the case of house dust, most patients become so careful in avoidance that 1 or 2 years of treatment are considered adequate In poor environments, especially where asthma is severe house dust treatment may have to be given indefinitely

Chapter 8

MANAGEMENT OF PROBLEM CASES

In the management of childhood asthma as in such fields as orthopedics and orthodontia success depends to a large extent on efficient follow up In most cases this involves little more than proper attention to standard allergic routine but in others it may be very difficult and tedious and these problem cases call for all possible skill and perseverance This chapter will be devoted to the important sources of treatment failure and to the methods indicated for correction

Failure in Family Cooperation

In spite of the most careful attention to family education there will be an occasional case where the parents are unable or unwilling to cooperate At times as when the family is broken or a parent is mentally incompetent the physician may face an impossible situation but in the great majority of cases a relationship can be established which will make successful management of the case possible It is well to remember that the family very likely has other problems besides the child s asthma problems perhaps of even greater importance

It is seldom that a family will fail the physician when he makes it clear that he has a genuine interest not only in their child but in their problems in general He is especially likely to be successful in winning their confidence if his fees do not impose an undue burden on the

family budget! Many allergists have found it wise to treat all asthma on the basis of a flat fee covering all services rendered during a stated period of time This not only allows the parents to budget the allergy fee but encourages them to bring the child in often enough and long enough to insure proper control

Incomplete Avoidance

Since avoidance is of the utmost importance in asthma it is necessary that the follow up include frequent checks of this phase of treatment As the asthma becomes quiescent it is only natural that the child and those about him become lax in avoidance It may be found that one child has been given a house pet because he didn t react to the skin test that another sensitive to egg has been eating a new and egg containing brand of ice cream or candy that another is using a feather pillow on top of his foam rubber pillow

The more the allergist shares his understanding of allergy with mothers and the less he relies on involved prepared lists the better will allergens be avoided The mother who really understands what is being avoided and why such restriction is necessary may be depended on to see to it that this important phase of treatment is successfully carried out

Slow Response to Hyposensitization

Although some children respond to hyposensitization with remarkable promptness others respond very slowly This is notably true in mold allergy especially in cases of long standing In such cases the allergist is well advised to inform the parents in advance that although there should be constant improvement good control may be delayed for a year or so Having the mother watch daily

fluctuations in the mold count is of great help in cases where results of mold treatment are slow It helps her determine when outdoor activities need to be restricted and makes it possible for her to see increasing resistance to concentrations of spores which have in the past brought on severe asthma

New Sensitivities

Although children with asthma are perfectly capable of developing new sensitivities at any time they are fortunately not especially inclined to do so This is particularly true when the mother has been properly instructed in allergic prophylaxis When however the youngster either fails to respond to treatment of relapses from adequate control the possibility of new sensitization is to be considered Among inhalants pollens are especially likely to appear well after other allergens have been identified and controlled At times a food which has not previously been eaten is introduced into the diet with resultant relapse Among the many which may react in this way are chocolate legumes cinnamon black pepper food colors shrimp walnut cottonseed meal mint and strawberry

Psychic Factors

Although allergists in general dissent from the theory of the psychogenic origin of asthma unusual psychic stress is a recognized contributing factor in certain cases A patient of the writer a very allergic girl of 6 years whose father regularly expressed his frank hatred for her was much relieved of asthma following his sudden death Another little girl also known to have widespread sensitivities was openly rejected and neglected by both parents who were divorced shortly after the child was first seen In her case there was a less obvious relationship between

her unhappy situation and her asthma, but certainly the broken home made impossible proper attention to her allergic needs

Whatever the role of psychic factors in asthma, the allergist is first of all a physician and will be certain to do all he can to free any of his young patients from the tragedy of an unhappy childhood *He must not, on the other hand*, use the psychosomatic theory as a convenient excuse for his failures

Hidden Food Allergens

The problem in intractable asthma which is at once the most important and difficult is that of hidden or latent food allergies It is a *difficult* problem because hidden food allergens may become manifest only when the child is under stress It is an *important* problem because failure to recognize guilty foods is certain to lead to poor results if not outright failure When the child is carrying a heavy load of inhalant allergy, or is under nonspecific stress as from infection or chilling, these subtle offenders become of the greatest possible significance

At times the presence of hidden food allergens can be picked up by repeated individual eliminations However, this has the disadvantage of being an extended process and the patience of the family (and the faith of the neighbors) is sorely tried With the use of the following diet the writer has had excellent results This diet called the 8 day diet because of its duration, eliminates all common offenders while rotating all others A record of foods and symptoms is kept on a food diary sheet (Fig 11) If asthmatic and other allergic symptoms clear remarkably during the 8 days of the diet, one of the foods which was completely eliminated is suspected If he clears on certain days and flares on others, one of the foods or food families be

ing rotated is suspected Many times at the end of the diet the child is relieved, but the cause is unknown In this case, the rotation is continued and eliminated foods are returned to the diet in turn until the culprit is found Often the diet cannot be used as shown because it contains known food allergens but it is not difficult to make substitutions

The 8 day diet as given below includes the instructions given to the patient s mother

EIGHT DAY DIET

This diet eliminates all common foods and rotates the rest

You may cook with vegetable oil and shortening sugar and salt Although butter and oleo contain traces of milk they can be used in moderation

The child does not have to eat any particular food and since this is a very strict diet it is wise to allow him to eat when he wants and as much as he wants

Note on fruits When a fruit is allowed it must be either fresh dietetic (water pack) or dried It must not contain either food dye or corn syrup

		First or Second Days
First Day	Beef (hamburger breakfast beef dried beef roast steak etc)	Banana Ginger ale
	Potato potato chips	Beet Spinach
	Tomato tomato juice	Date Tapioca
		Cucumber pickles
		Lettuce Cantaloupe
Second Day	Pork (ham fresh pork bacon lard etc)	Squash Watermelon
	Lamb	Cranberry Current
	Beans peas peanuts	Gooseberry Rhubarb
	Apple cider apple vinegar	
	Pear	
		Third or Fourth Days
Third Day	Chicken (not hen)	Carrot Celery
	Grape grape juice raisin	Broccoli Cabbage
Fourth Day	Fish (salmon tuna fresh fish etc)	Cauliflower Turnip
	Onion	Brussel sprouts
	Asparagus	Olive Tea Radish
	Plum prune peach cherry	Parsnip Sweet Potato
	Almond	Pineapple Fig

After following this diet for four days the child repeats the same schedule for an additional four days. Keep a record of all foods, drinks and medicines taken during this period on the diet diary sheet. Also make note of any allergic symptoms that occur during the eight days.

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Chapter 9

ALLERGIC COOKERY

The great majority of mothers faced with the task of restricting the diet of their allergic children quickly adjust to these restrictions and, even with little if any instruction, learn to prepare well balanced and palatable diets However, they will learn to do so much more quickly and satisfactorily if they start with certain fundamentals of food avoidance and substitution which have been learned by others It is the purpose of this chapter to outline these fundamentals A few recipes will be given all of which have been brought in by mothers who have actually put them into use, but for the most part discussion will be devoted to fundamentals and basic principles These will be discussed according to the food to be avoided

MILK-FREE DIETS

Since cow's milk is a universal food in infants and children, milk substitution is a real problem In infants the most practical solution is the use of one of the soy milks' The product with which the writer has had the most experience is Mullsoy® It is palatable, and numerous reports have shown it to be equal to cow's milk nutritionally

In older children unable to take milk, the intake of animal protein should be high, and the eating of meat, fowl, egg, and fish is encouraged Useful calcium supplements are Calcets (Walker), Syrup of Neocalglucon

(Sandoz), calcium lactate, calcium wafers, or even calcium carbonate powder

Since children almost always are very fond of ice cream and other frozen desserts, most mothers of children with milk allergy are glad to know of ways of making substitutes Delicious ices may be made with fruit pulps and juices Soy milks or the coffee cream substitute Mocha Mix * may be used as a base for ice cream The latter is also useful as a substitute for milk on cereals but it must be pointed out that unlike soy milks it does not have the nutritional value of cow's milk

Raspberry Ice

1 package raspberry flavored gelatine
½ cup sugar
1½ cups hot water
¼ cup lemon juice
2 packages frozen raspberries thawed sieved
(Other fruits and gelatine flavors may be used)
Dissolve gelatine and sugar in hot water and cool Add lemon juice and fruit pour into refrigerator tray freeze Break up beat smooth and refreeze 3 hours

In cooking, most mothers find it best to learn to cook without creaming foods, using water in gravies and sauces Vegetables may be buttered in most cases, as creamery butter contains very little milk protein

EGG-FREE DIETS

Egg is used in cooking for its flavor, binding qualities and (by trapping air in whipping) as a leavening agent It also makes baked goods lighter and moister There is no efficient substitute for egg in cooking, but by exercising sufficient ingenuity, the mother can do very well without it By local inquiry, ice creams and sherbets can be found which are made without egg Most children are very fond of canned noodle soup which contains egg

*Aerated Products 2714 Cherry Kansas City Mo

noodles and probably hen, but mothers can make their own noodle soup with egg free noodles and friers

It is in baking that a knowledge of egg substitutes is especially valuable Since even the baking powder may contain egg, the mother is directed to use either KC Dr Price s, or Royal baking powders Fruit pulp is useful as a moistening and binding agent

Wacky Cake

Start heating oven to 350°

Sift together 1½ cups sifted all purpose flour ½ tsp salt 3 tablsp cocoa 1 tsp baking soda and 1 cup sugar Make 3 holes in ingredients in first hole put 1 tsp vinegar in second 1 tsp pure vanilla extract in third 5 tablsp salad oil Over whole thing pour 1 cup water Mix well Bake 30 min or until tester comes out clean This cake is mixed in the same pan in which it is baked

Eggless Cake

2 cups cake flour
2 tsp egg free baking powder
¼ tsp salt
1/3 cup shortening
1 cup sugar
¾ cup Mocha Mix (or water)
1 tsp vanilla

Sift flour once add baking powder and salt Sift again Cream sugar and shortening Add flour mixture and Mocha Mix and beat well

Bake in two 8 inch cake pans or loaf pans Set oven at 375 and bake 20 minutes

(1 mashed banana or a pinch of soda may be added)

Chinese Almond Cookies

2 cups flour
¾ cup sugar
1 tsp almond extract
1 cup shortening at least half butter or oleo
Mix shortening and flavor thoroughly
Add flour and sugar
Kneed until rolls
Slice Bake at 350° 30 minutes

CORN FREE DIETS

The chief problem in corn allergy is the avoidance of corn syrup often one of the worst corn offenders Since corn starch is not widely used in commercial foods or in home cooking it is not a major problem and most allergists feel that corn oil and corn sugar are not antigenic Sugar honey brown sugar and maple sugar (and syrup) can be used where fruits desserts candies and baked goods are to be sweetened Children who get hungry for popcorn may be given peanuts (or other nuts as tolerated) salted non corn breakfast cereals various crackers potato chips and pretzels

WHEAT FREE DIETS

Nothing is more exacting than the avoidance of wheat and since wheat owes its excellent baking qualities to gluten other flours are far from satisfactory Two rye products Ry Krisp and canned rye bread are taken well by many children especially if they are toasted Flours used in place of wheat flour are tapioca flour soy flour arrowroot flour and potato flour Because of their close biological relation to wheat flours made from grains such as corn rice oat and rye although not forbidden are not to be encouraged for general use

Peanut Butter Cookies
(Contain no grains)

½ cup brown sugar
½ cup sugar
½ cup vegetable shortening
½ cup peanut butter
1 cup tapioca flour
1 egg beaten
½ tsp soda
¼ tsp vanilla
½ tsp salt

Bake 1 to 15 minutes at 400
Makes about 2 or 3 dozen

Macaroons

(Contains no grains)

Beat until stiff ½ cup egg white Beat in 1¼ cup sugar ¼ tsp salt ¼ tsp vanilla and 1 cup broken nut meats not too fine Drop from level tsp 2 inches apart on ungreased wrapping paper on baking sheet Bake until set and delicately brown Coconut 2½ cups may be used in place of nuts

TOMATO FREE DIETS

Although tomato is widely used in cooking it is surprising how easily it may be avoided For example a delicious combination salad may be made with lettuce carrot cauliflower pepper radish celery and other raw vegetables plus an appropriate salad dressing Soups chili and stews will be found to lose little from the elimination of tomato In the making of chili sugar and vinegar supply much of the sour sweet character of tomato

CITRUS FREE DIETS

Children who cannot take citrus juices may use as substitutes grape juice pineapple juice tomato juice apricot nectar apple juice etc For eating between meals most children like grapes plums apples pears bananas and peaches Many children like raisins prunes and other dried fruits as is

FOOD DYE FREE DIETS

Children who must avoid food dyes and flavors must avoid pop Popsickles frankfurters Jello Koolade oleo colored ice cream and several other foods In place of colored carbonated drinks they can be given the clear mixers like ginger ale and white soda Gelatine desserts may be colored and flavored with fruit juices Sensitivity to food dyes does not necessarily extend to all colors Experience will show which of these must be avoided

MEAT-FREE DIETS

The child sensitive to pork may be given lamb patties, breakfast beef (in place of bacon), hamburger fish chicken, and egg The child with beef allergy often takes pork steaks, lamb patties and chops and other meats very well The child sensitive to fish may be able to eat shrimp and vice versa Chicken allergy is rare, and when there is doubt as to the other meats it is very useful as a source of animal protein

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